DOCUMENT RESUME

ED 040 485	24	CG 005 735

AUTHOR	Howell, Richard W.
TITLE	A Study of Informal Learning. Final Report.
INSTITUTION	City Univ. of New York, N.Y. Richmond Coll.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Bureau of Research.
BUREAU NO	BR-8-B-125
PUB DATE	Jun 69
GRANT	OEG-2-9-420125-1009
NOTE	78p.
EDRS PRICE	EDRS Price MF-$0.50 HC-$4.00
DESCRIPTORS	*Geographic Concepts, *Interest Research, *Learning, Learning Characteristics, Maps, Map Skills, *Motivation, *Perception

ABSTRACT

Some 1750 sketch maps drawn in response to three sets of instructions by residents of, and commuters to, Staten Island and 138 extended interviews with residents suggest that informal learning is largely independent of formal learning. Cognitive maps which individuals form are practical instruments frequently bearing no resemblance to commercial maps of the given area. Generally, areas which are not relevant for individuals are not included on the maps. The most detailed and technically accurate maps were provided by those with a pride in the Island indicating exploration throughout the Island together with study of commercial maps. In this case, everything about the Island appears to be considered relevant, suggesting, in general, that if information is to be meaningfully absorbed it must be seen as having a direct bearing on the real life of the individual. (Author/CJ)

ED040485

BR 8-B-125
PA 24
CQ

FINAL REPORT

Project No. 8-B-125

Grant No. OEG-2-9-420125-1009

A STUDY OF INFORMAL LEARNING

Richard W. Howell

Richmond College

(The City University of New York)

Staten Island, New York 10301

June 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION
& WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

U.S. DEPARTMENT OF

HEALTH, EDUCATION, AND WELFARE

Office of Education

Bureau of Research

ED040485

Final Report

Project No. 8-B-125

Grant No. OEG-2-9-420125-1009

A Study of Informal Learning

Richard W. Howell

Richmond College

(The City University of New York)

Staten Island, New York 10301

June 1969

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view, or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

Table of Contents

A STUDY OF INFORMAL LEARNING

Acknowledgements........ 1
Summary........ 2
Introduction........ 3
  Informal versus formal learning........ 3
  Passive versus active learning........ 7
  Theoretical issues........ 8
  Systems of orientation........14
  Staten Island in the New York context........15
Methods........17
  Data collection........17
  Analyses........22
Results........25
  Major orientations........26
    Standard........26
    North Shore........36
    Brooklyn........41
    Other........47
  Dimensionality........52
  Developmental aspects........56
  Formal versus informal aspects........66
Conclusions........70
References........72

List of Figures

Figure 1. Staten Island communities........ 5
Figure 2. Staten Island travel routes........ 6
Figure 3. Fourth-grader's map showing up-state New York places included on Staten Island........ 9
Figure 4. Fourth-grader's map showing Staten Island neighborhood (West Brighton) in up-state New York........10
Figure 5. West Brighton woman's conception of the Island based on bus mode of transportation........12
Figure 6. Sketch map of a "proud" Staten Islander........16
Figure 7. Sketch map of a West New Brighton woman, showing the relative importance of auto routes........20
Figure 8. Composite map showing "down" areas of the Island........23
Figure 9. Standard orientation revealed in map of Tottenville sixth-grader........27
Figure 10. Neighborhood map placed in Staten Island context........28
Figure 11. Extreme variant of a standard orientation map........30
Figure 12. Representative "mirror map"........33
Figure 13. Standard orientation with North Shore displacement........34
Figure 14. North Shore orientation with reversals........37
Figure 15. North Shore orientation of Tottenville sixth-grader........38

Figure 16. North Shore orientation without reversals....................40
Figure 17. Mild Brooklyn orientation of student-commuter....................42
Figure 18. Ultimate Brooklyn orientation: the Island is nothing....................43
Figure 19. Map of Manhattan commuter to Richmond College....................45
Figure 20. Classic Brooklyn orientation shown by native Islander....................46
Figure 21. Map of native who cannot identify with the Island....................48
Figure 22. Ethnocentric Tottenville map....................50
Figure 23. Ethnocentric Castleton Corners map....................51
Figure 24. Arteries that one goes "along"....................53
Figure 25. Areas toward which one goes "out" on the Island....................55
Figure 26. Fourth-grader's map, consisting mainly of drawings of important features....................57
Figure 27. Fourth-grader's map showing Island and local features....................58
Figure 28. Fourth-grader's careful neighborhood map....................60
Figure 29. Map of Tottenville 6th-grader whose family usually shops in New Jersey....................63
Figure 30. Representative Tottenville 6th-grade map....................64
Figure 31. Tottenville 6th-grader's North Shore orientation....................65
Figure 32. Tottenville 7th-grader's map, with reversals....................67
Figure 33. "Sketch map" of high school student, showing final digit(s) of postal zones....................69

ACKNOWLEDGMENTS

There is no way I can convey fully my appreciation for the assistance I have received from my wife, Jacqueline, over the years. In the present case, she has done the lioness' share of the work and has provided innumerable insights. To our son, Benjamin, we are both indebted for the masterful job he has done in reproducing the maps which illustrate the study.

During the exploratory phase of the investigation we received valuable help from Miss Eve LaPenna of Richmond College, Mrs. Phyllis Richards of P.S. 45, and Miss Ann Gilroy of the Notre Dame Academy. The majority of maps were obtained through the good offices of Sister Catherine Molony and Sister Rita King of St. Joseph By The Sea High School, Sister Mary Monica of Our Lady Help of Christians School, Sister Theresa of Blessed Sacrament School, and Sister Mary Charlotte of St. Joseph Hill Academy. The help of the Sisters is doubly appreciated because at the time we were gathering most of our data the public schools were rendered inaccessible by the teachers' strike.

In addition to the hundreds of residents and commuters who were kind enough to serve as informants on the study, we owe a special debt of gratitude to Loretta and Austin Mitchell of Eltingville, who not only were generally most helpful, but whose difference of opinion over whether one goes up or down to St. George served as the inspiration for the whole study.

Richard W. Howell
Project Director

SUMMARY

Some 1750 sketch maps drawn in response to three sets of instructions by residents of, and commuters to, Staten Island and 138 extended interviews with residents suggest that informal learning is largely independent of formal learning. The cognitive maps which individuals form of the Island are practical instruments which frequently bear no resemblance to commercial maps of the Island.

More than half of the maps show an orientation similar to that of the commercial maps, but frequently are unclear about the cardinal directions and often include significant distortions. The western shore facing New Jersey, for example, which is sparcely populated and which is generally considered to be without interest or importance, tends to disappear from the sketch maps, with the result that the North Shore is drastically curved toward the south. As a rule, areas which are not relevant for individuals are not included on the maps: children often show only the important landmarks in their immediate neighborhoods, and commuters usually show only those landmarks and transportation routes that guide them to their destination on the Island.

Individuals who govern their own transportation, whether by walking or by driving, tend to show appropriate changes of direction, while those who are passively transported, as on the train, more frequently depict the routes as being in a straight line even if they know academically that there are curves and turns. The reason seems to be that if one does not actually have to do anything to get from one place to another, then no matter what the vehicle does, the route is for the individual a straight line: he simply gets on at one point and gets off at the other.

Where there is imperfectly understood formal knowledge, such as the correct shape of the Island according to commercial maps, there may be gross distortions. Thus the North Shore orientation reverses the north-south arrangement of communities while preserving the original north-south orientation of the outline of the Island. The North Shore orientation is peculiar to residents of the Island, but is manifested by individuals from various parts of the Island and by individuals of all ages.

The most detailed and technically accurate maps are provided by individuals with a lively interest and pride in the Island, who combine the kinds of information available on commercial maps with the kinds of information gained through direct personal experience in moving around on the Island. In this case, everything about the Island appears to be considered relevant. And the study as a whole leads to the conclusion that if information is to be meaningfully absorbed it has to be seen as having a direct bearing on the real life of the individual.

INTRODUCTION

Informal versus formal learning.

Informal learning contrasts with formal learning in that the latter is the result of deliberate instruction. Most studies of learning are in fact studies of teaching, since hypotheses about how learning takes place are tested by manipulating the variables which are presumed to be critical. Thus one popular pedagogical volume (Townsend and Burke 1962) quite understandably treats most of the notions derived from experimental studies of learning--motivation, remembering, forgetting, generalization, discrimination, transfer, reinforcement, and the like--without being concerned with the circumstances under which learning takes place in the absence of deliberate or conscious control. Ultimately, so far as learning theory is concerned, it may not matter a great deal whether one speaks of formal or informal learning: the psychological variables are presumably the same. But when informally acquired knowledge and attitudes may be in competition with, and may even take precedence over, what is presented through formal instruction, it is clearly important to gain some understanding of how informal bodies of information are acquired and developed.

The competition between formal and informal learning often reduces to a question of relevance. For the Ph.D. aspirant, the day he passes his German examination may be the last experience he has with that language. The formal learning experience, in that case, has been an exercise with greater ritual than practical value. Puerto Rican students in New York City may study literary Spanish in school, but most of them will revert to their own dialect as quickly as they pass through the door onto the street. Why? Because at home and in daily interaction with their friends literary Spanish simply is not relevant. Where they depart from Puerto Rican Spanish, the speech variety employed is more likely to be a form of English (see Fishman et al, 1968). And the reason is simply that in New York, English has relevance.

While one's native language is essentially an informally acquired system, certain varieties, such as "polite" or "formal written" English, are typically the product of formal training. Yet there are rules, largely unconscious, which govern which speech variety will be employed on a given occasion (Howell 1968). These rules, too, are for the most part informally acquired.

Clearly the rules which govern behavior in the "real world" outside the classroom need not derive from formal instruction. In the workaday world we all observe rules of conduct that we share with those groups with which we identify, and we have patterns of expectations with respect to those with whom we interact. Virtually every move we make is influenced by learning, and the majority of that learning is of an informal nature. Language is the most studied informal system, but there are less obvious systems of information which are established outside the classroom. Edward T. Hall (1959, 1966), for example, has shown that time and space are differently handled in different cultures. How long one waits for an appointment, how much time must elapse before one is late, or how close two men stand when they are conversing, these are all culturally patterned rules, informally acquired and carefully observed. More generally, Harold Garfinkel and others have recently defined a subdiscipline of sociology (ethnomethodology) which is devoted to the study of the socially structured scenes of everyday life which are used by members of society as schemes of interpretation (Garfinkel 1967; see also Goffman 1961 and elsewhere). These again are informally learned and rarely reach the awareness of the individual, yet because they involve unspoken assumptions we make about the people we interact with, they may give rise to frequent misunderstandings. An example of the ethnomethodological approach to behavior has been provided by Emanuel Shegloff (1968) in which opening sequences to telephone conversations are shown to be very strictly patterned; a graduate student at Hunter College has shown that the closing sequence, too, is so tightly patterned that any departure from the rules may lead to an abrasive episode (Wangerin 1969).

The present study concerns a specific network of informally acquired conceptions which are generally taken for granted, and then to determine how that network was established. In particular, we shall be concerned with the system of orientation which is employed by native and nonnative residents of Staten Island, New York, and by commuters to the Island. Unlike ethnomethodology, the orientation study relates people to a common external and relatively static entity, Staten Island; ethnomethodology is concerned with the rules which relate people to people. In this respect, then, we may refer to orientation as a cognitive structure, and we may consider that the study is closer to the sort of investigations which are conducted in the name of ethnolinguistics or ethnoscience. Charles O. Frake (1961), for example, has analyzed disease categories among the Subanun in the Philippines; Harold Conklin (1955) has studied the color categories of the Hanunóo, also in the Philippines, showing that instead of the criteria we are familiar with, such as hue, saturation, and brightness, the Hanunóo consider color in terms of relative dessication and relative darkness. Similar studies often are traced to the linguistic relativity arguments of Benjamin Lee Whorf (1956), which consider the extent (if any) to which linguistic forms guide perception. In the case of Frake and Conklin, or of Berlin and Romney (1964) and other ethnolinguists, the concern is primarily with the cognitive structures in question, whether or not Whorf's theories are valid. Ethnolinguists generally consider such studies necessary for a more perfect understanding of the people they are concerned with, but the structures they uncover are, again, essentially unspoken assumptions about the nature of the everyday world.

The study of orientation on Staten Island assumes that relevant formal learning will correspond to the kinds of information which guide commercial maps of the Island. Thus north should be up, toward the top of the map, east should be toward the righthand margin, south toward the bottom of the map, and west should be toward the lefthand margin. South should be down, or toward the reader if the map is on a horizontal surface. General orientation, then, should be in terms of the cardinal points. If individuals draw maps of the Island, places should be related to each other in terms of

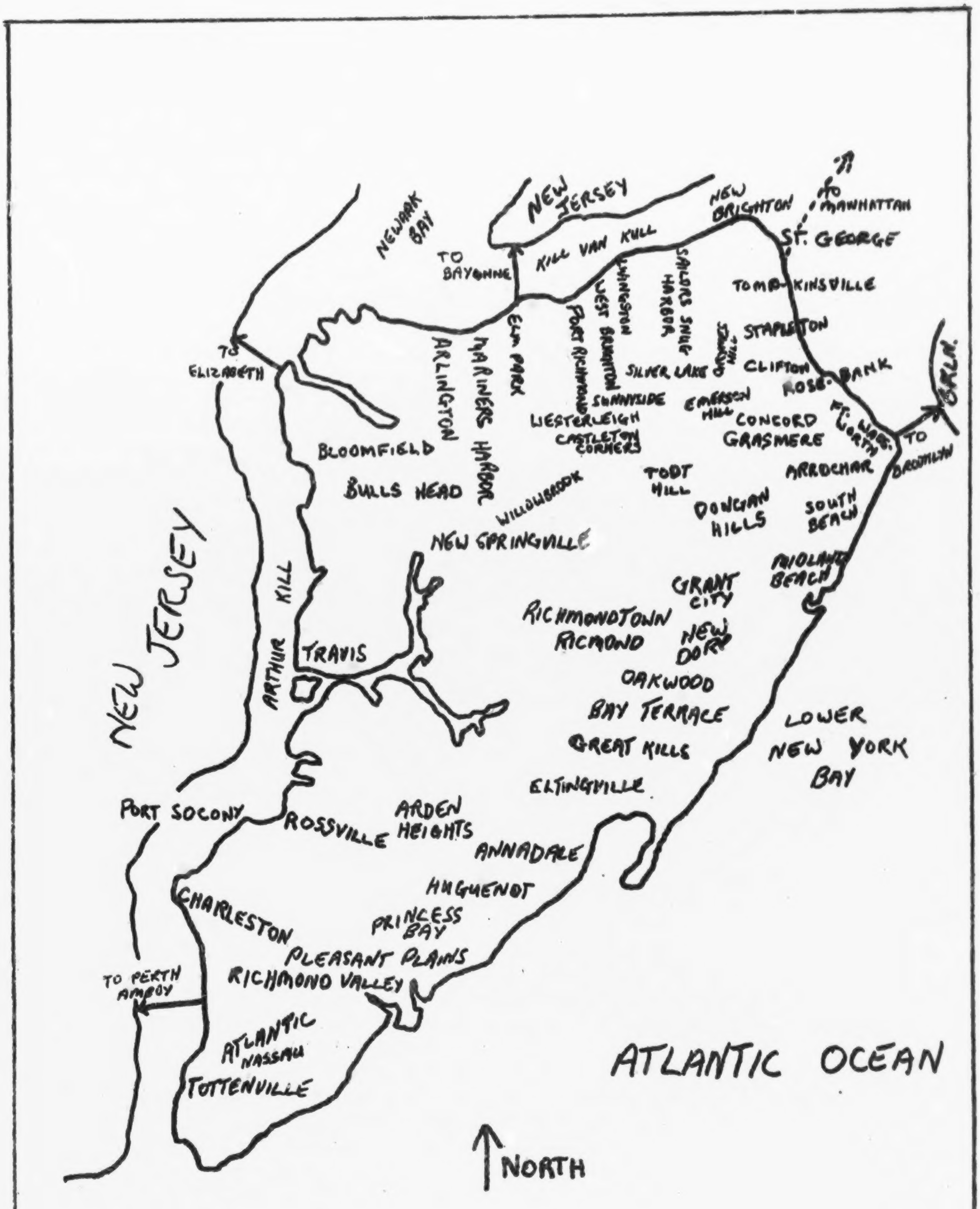

Figure 1. Staten Island communities.

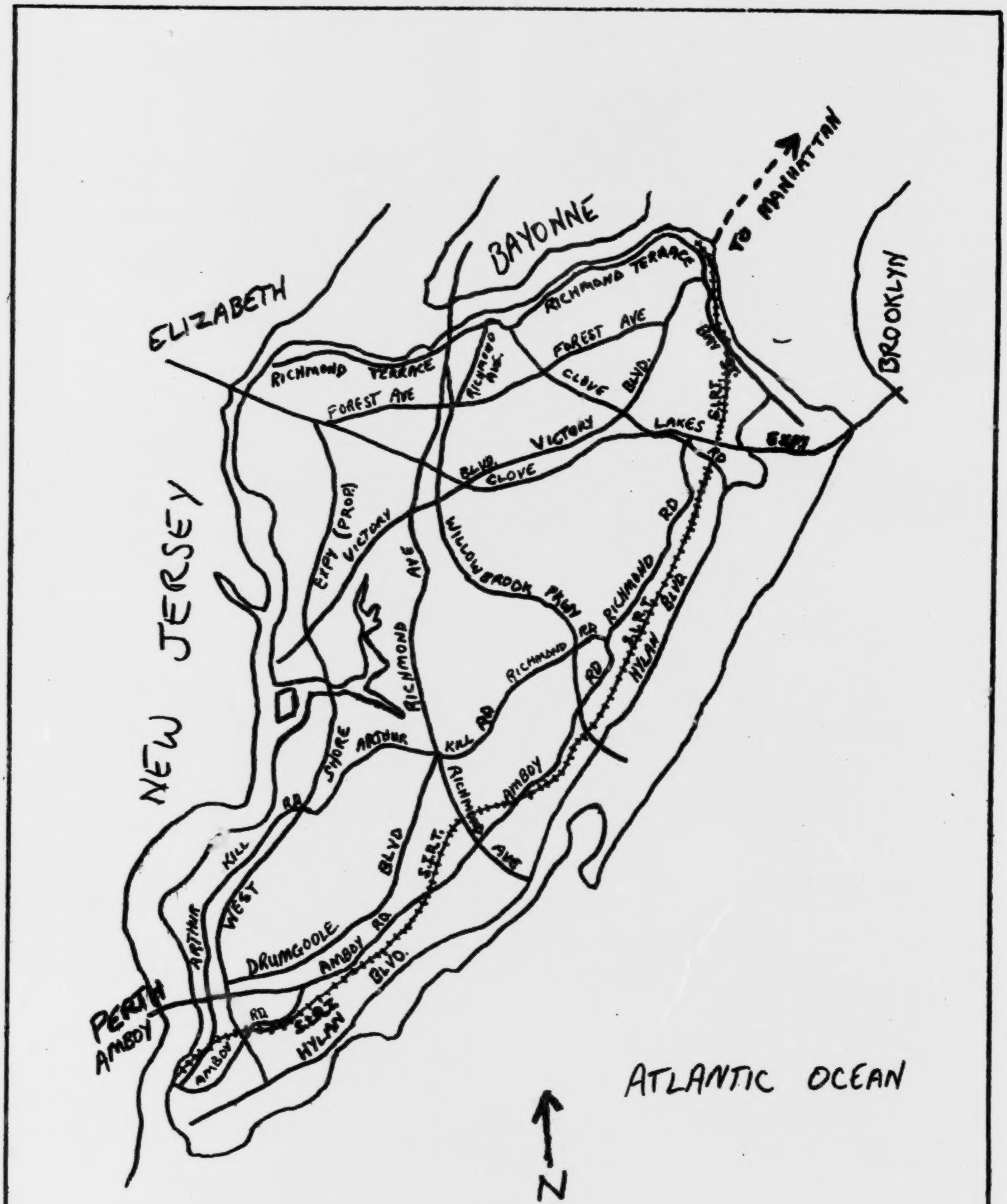

Figure 2. Staten Island travel routes.

standard units, so that two points equidistant from a third in terms of miles, for example, should be drawn roughly equidistant from that point. Knowledge of the Island which is derived from formal sources of information, such as the various commercial maps of the Island, should be reflected in sketch maps that resemble Figures 1 and 2. Consistent departures from this general cartographic scheme imply a system of orientation which is independent of what is likely to be taught in a classroom situation. We have maps drawn under various conditions, including those most likely to yield approximations to Figures 1 and 2. But the evidence is that maps obtained under those circumstances have very little to do with the way individuals actually conceive of the Island. We have found very little correspondence between the way our informants view the Island and the general features of standard commercial maps. On the sketch maps elicited without formal guidance, the shape of the Island varies widely: some have no boundaries; some are simple squares or circles; some show the "proper" shape of the Island but with all places reversed, either from top to bottom or from right to left; "north" is almost as likely to be shown in the direction of the South Shore as it is to the North Shore. In general it will be seen that conceptions of the Island are practical instruments which have developed through the experience individuals have had on it. There is considerable individual variation in the sketch maps, and while there are three major orientations (Standard, North Shore, and Brooklyn), they do not correspond very exactly to the particular residential areas of the informants producing them. In brief, conceptions of the Island depend primarily on informal learning acquired through modes of transportation and information acquired more formally is relevant only in a very minor way.

Passive versus active learning.

Both formal and informal learning may be either passive or active: trying to retain what someone else says is passive, while seeking to discover principles for oneself is active. Active learning is often called "learning by discovery," while the extreme of passive learning is probably "latent learning." As we shall see in the next section, not all theorists accept the idea of latent learning, but we may for our purposes usefully distinguish between conceptions of the Island which are derived passively, as when one is transported by a vehicle driven by someone else (whether car, train, or bus), and conceptions derived more actively, by driving for oneself or by walking.

Whether one learns better by discovery than through the more traditional rote methods is not certain in the minds of some investigators (Wittrock 1966), but there is evidence that learning by discovery may be more meaningful or effective. In a preliminary report of some experimental work on the subject, Bruner (1959) described how a conventionally taught group of fifth-graders learned their facts on the geography of the North Central States, "And that was that....[They] learned passively that there were arbitrary cities at arbitrary places by arbitrary bodies of water and arbitrary sources of supply." Another group was given blank outline maps of the area, with only rivers, lakes and natural resources indicated. The students were asked to figure out where the main cities, railroads, and highways would be located, after which there was a general discussion to see how their choices could be justified.

> The discussion was a hot one. After an hour...permission was given to consult the rolled up wall map. I will never forget one young student, as he pointed his finger at the foot of Lake Michigan, shouting, "Yipee, Chicago is at the end of the pointing-down lake." And another replying, "Well, OK: but Chicago's no good for the rivers and it should be here where there is a big city (St. Louis)." These children were thinking, and learning was an instrument for checking and improving the process. To at least a half dozen children in the class it is not a matter of indifference that no big city is to be found at the junction of Lake Huron, Lake Michigan, and Lake Ontario. They were slightly shaken up transportation theorists when the facts were in (pp. 187-188, quoted in Wittrock 1966: 34-35).

Gagné (1966) is probably correct in asserting that both kinds of learning are necessary for economical progress. Discovery without any guidance--sheer trial-and-error learning--is a painfully slow process, and it is doubtful if the concept of "circle," for example, is learned more thoroughly or more usefully if a youngster must discover it by abstracting from a large number of instances rather than by simply having the concept explained to him. The critical point, whether involving informal or formal learning, passive or active learning, is what Bruner (1966) calls the "compatibility problem, the problem of how to get a new piece of knowledge connected with an established domain so that the new knowledge can help retrieve what is likely to be appropriate to it as needed" (p. 109). The present study suggests that a simple statement of fact need not constitute the guidance necessary to connect new information to an established domain. Indeed, even a period of detailed formal instruction may not constitute adequate guidance. Students who had been studying the geography of New York State, for instance, were not in an advantageous position when it came to providing sketch maps of Staten Island; in fact, the formal learning seems actually to have confused them. There was a great tendency to include within a rough outline of the Island such improbable landmarks as the Catskills and Lake Erie (Figure 3), or the West (New) Brighton area of Staten Island (where the school is located) is simply placed arbitrarily in a map of New York State (Figure 4).

Theoretical issues.

We have suggested that the extreme condition of passive learning is latent learning, but not all theorists can accommodate themselves to the concept. That is, extreme reinforcement theorists deny that any learning takes place in the absence of reinforcement. The evidence for latent learning, as in rats who are allowed to run a maze without reinforcement and later, when a reward is provided, demonstrate quicker learning than among rats without the unrewarded familiarization experience (see Tolman 1948), or experiments which suggest that learning can occur through the formation of "expectancies" without the elicitation of instrumental responses (Dodwell and Bessant 1960), is sufficiently clear to render truly academic the arguments against latent learning. One can argue, for example, that in the case of the rats in the maze there is an exploratory

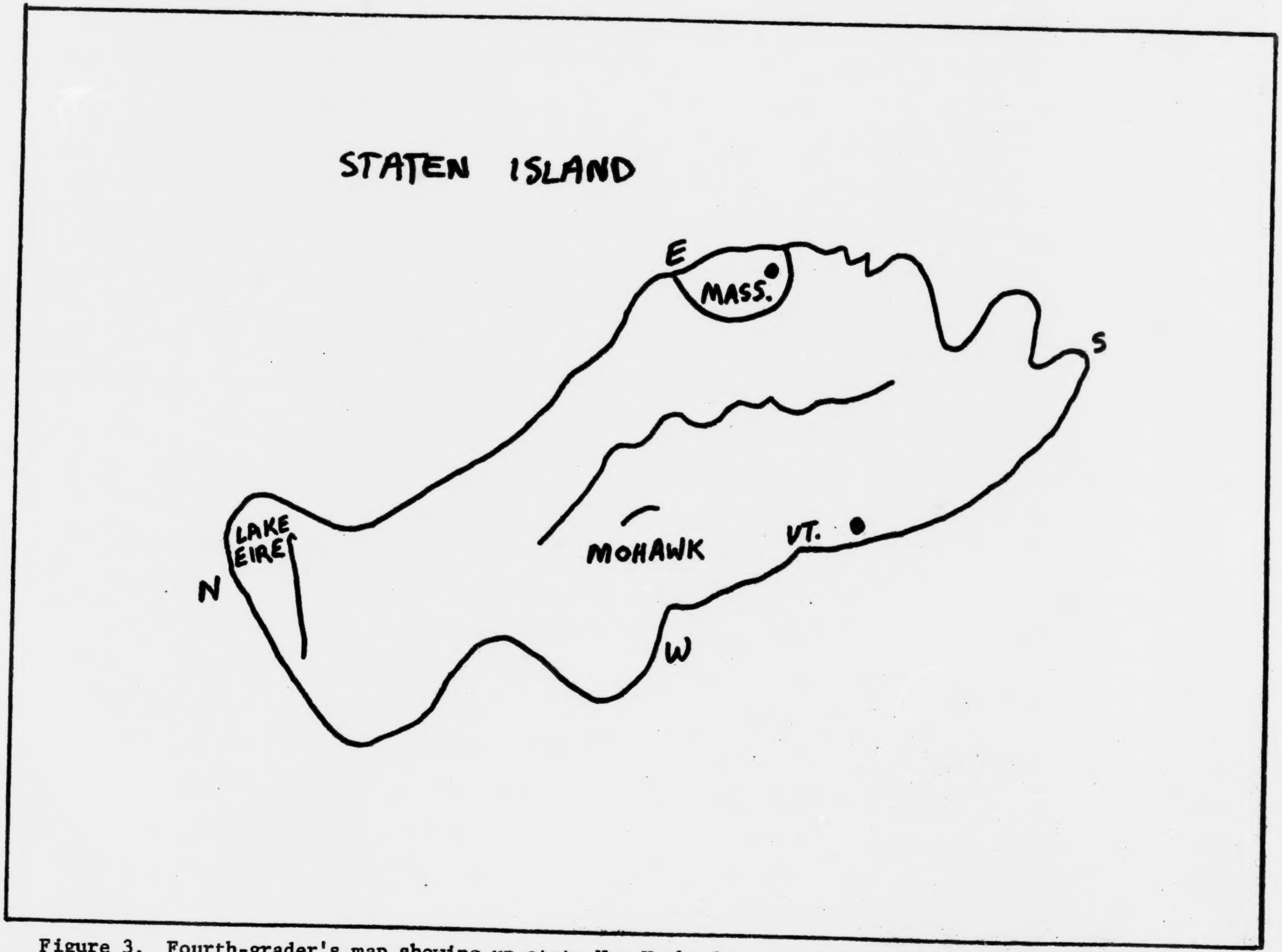

Figure 3. Fourth-grader's map showing up-state New York places included on Staten Island. See text.

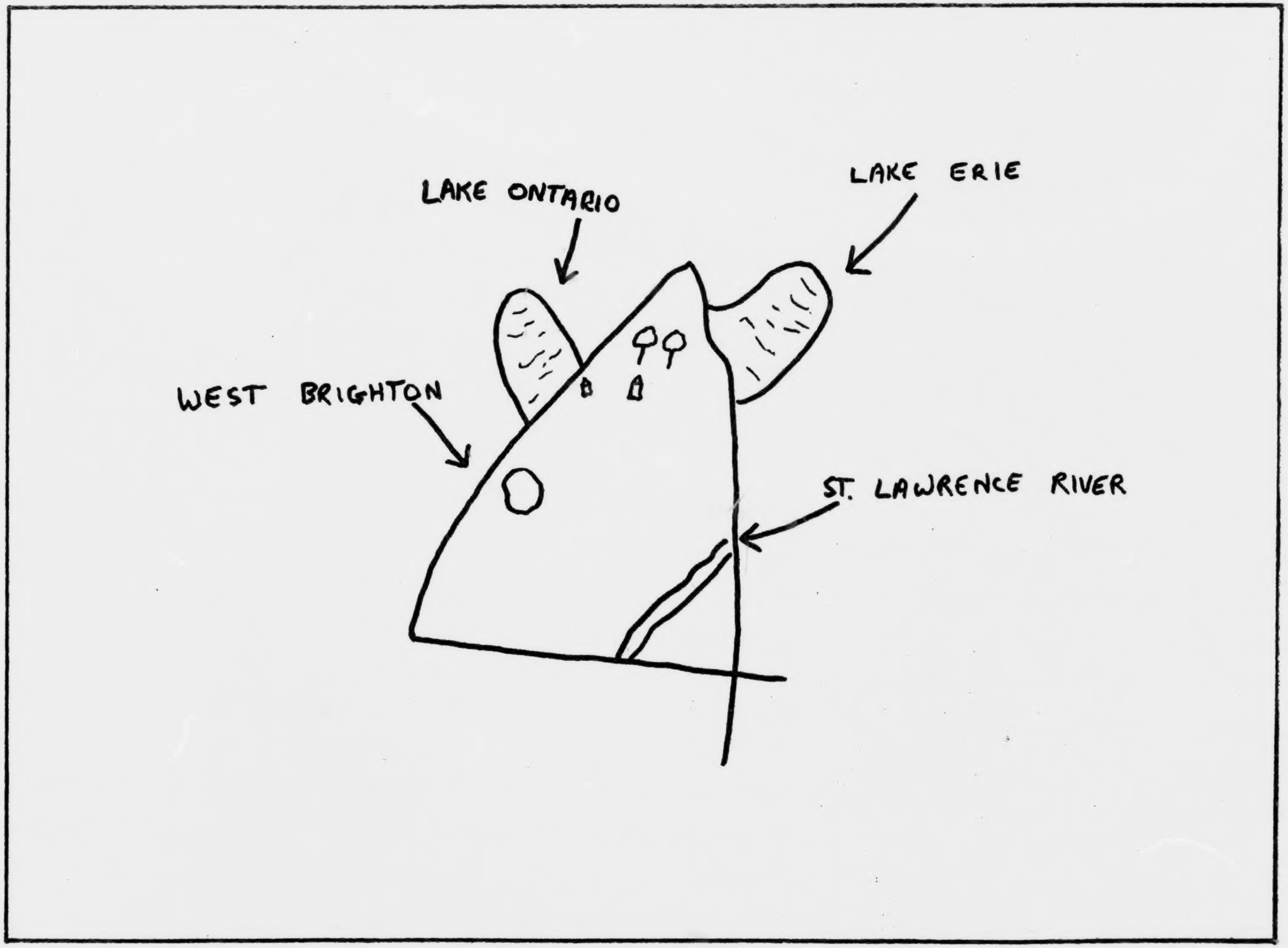

Figure 4. Fourth-grader's map showing Staten Island neighborhood (West Brighton) in up-state New York. See text.

drive which is reduced by the act of running around the maze even in the absence of conventional rewards such as food or water. It hardly matters here, since we need not be concerned with the extremes of passive learning.

The issue of latent learning is of concern as an issue which seems to separate stimulus-response and cognitive theories. S-R, or associative learning, is considered to be a question of habit formation, as against what Hilgard and Atkinson (1967) call "learning with understanding." The learning with understanding depends on cognitive processes, is receptive to the idea of latent learning, and is not irrevocably tied to reinforcement theory. The present study carries implications for both approaches.

So far as general learning theory is concerned, the most obvious point of departure here is the currently neglected "cognitive map" variety of mediation theory developed by Edward Chace Tolman (1948). According to this view, incoming impulses from stimuli are worked over and elaborated into a tentative cognitive map of the environment that eventually accounts for behavioral responses in learning situations. Support for this conceptual approach is found in latent learning experiments; vicarious trial and error behavior--the hesitating, looking back-and-forth kind of behavior which appears when a rat is at choice-point—which suggests that the animal is not just responding passively to discrete stimuli but is instead actively selecting and comparing stimuli; in certain types of avoidance experiments, where the animal has difficulty in learning what to avoid if the object which provides shock is removed at the moment of shock; in hypothesis-testing behavior which occurs in insoluble problem situations; and in spacial orientation experiments, where rats may climb over the top of an alley maze to get to the goal quicker. All of these argue against the notion that the rat is the passive victim of a succession of external stimuli, such as sounds, smells, pressures, and the like, impinging on his external sense organs, plus internal stimuli from the viscera and from the skeletal muscles.

The nature of many maps in this study, however, suggests that simple associative learning cannot be ignored. Where informants have been actively responsible for their own transportation, whether on foot or in an automobile, an argument can be developed for a motor component to the learning. Gagné (1966) maintains that in such cases learning depends to some extent on the motor-feedback, or the kinesthetic aspects, of the stimulus situation:

> This analysis suggests, therefore, that connection learning does indeed involve discovery, and that what is being discovered is the internal (kinesthetic) part of the stimulus. It also suggests that much, if not all, of the 'gradualness' of learning motor acts is an indication of the process of discovery, of internal search and selection (p.137).

Perhaps a familiar example of how this might be relevant is when we make an inappropriate turn "out of force of habit," if our current destination shares a common path part way toward a more highly frequented destination. Gagné (1966) feels that learning through the discovery of the kinesthetic part of the stimulus is most consistent with those modern learning theories which stress stimulus selection (Estes 1959, for example). Yet forming maps is more than a sequence of simple motor acts: the maps tend to represent a cognitive whole.

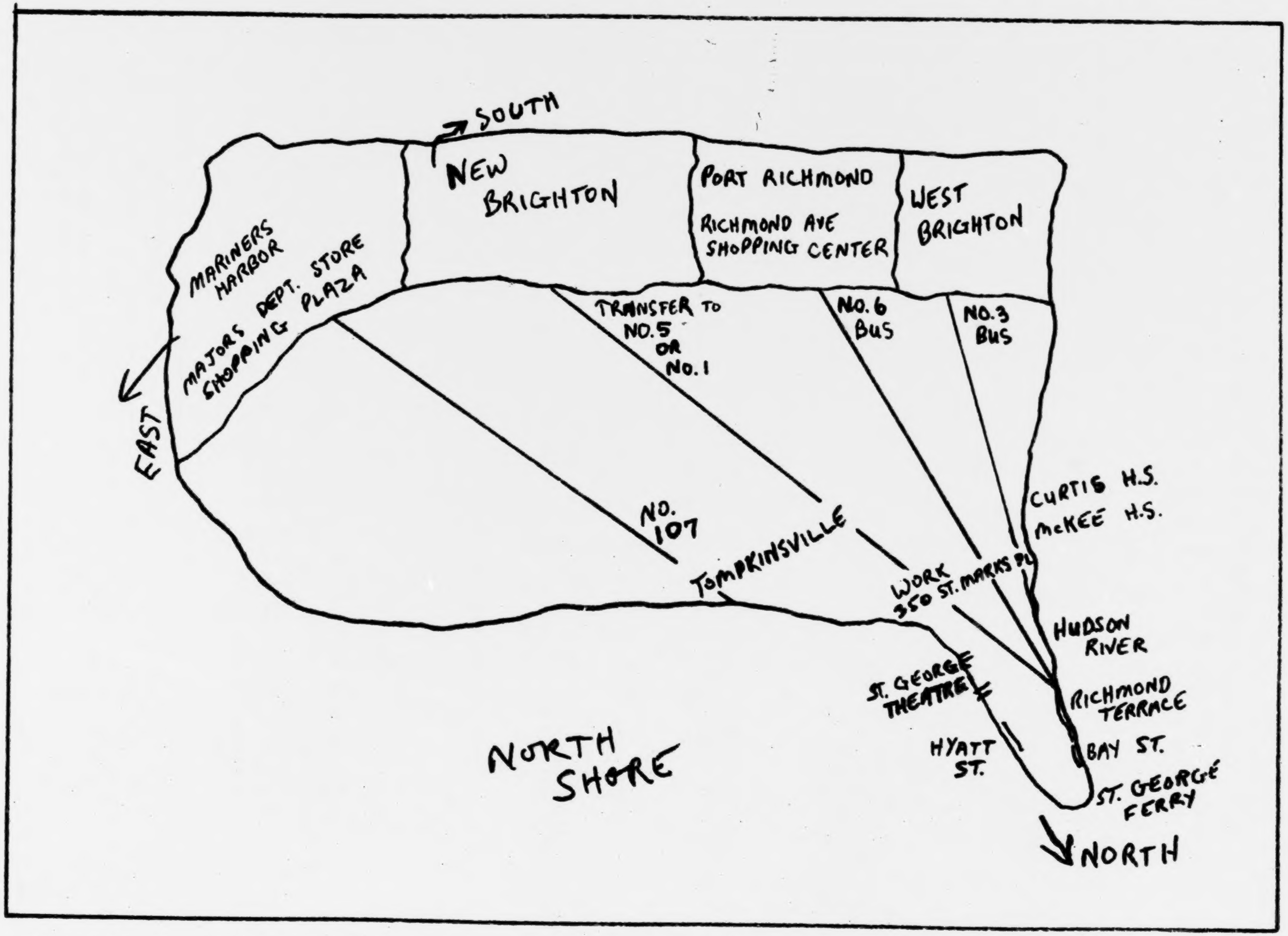

Figure 5. West Brighton woman's conception of the Island based on bus mode of transportation.

Franklin Fearing (1954) has provided a particularly pertinent discussion of interaction between the organism and its environment in which the responses of the organism are "not governed exclusively by the energy properties of the stimulus or stimulus pattern" (p.61). In reacting to a stimulus configuration the organism, in the present case the human individual, brings to bear its own inborn and experiential resources. Fearing distinguishes a perceptual from a cognitive level in considering degrees to which the properties of the stimulus field determine the response.

> In perception the contact is immediate, with a relatively greater opportunity for a feedback from the stimulus field ("reality"), which serves as a check on the "accuracy" or appropriateness of the perception. In cognition (or conceptualization) there is a relatively greater opportunity for the operation of interpretive or inferential factors (p.61).

While the two levels are not independent of each other, we might expect, for example, to see the differences reflected in neighborhood maps (based on relatively greater feedback) versus maps of the Island as a whole (based more on inferential factors). In Fearing's view, cognition is a structuring activity in which the organism imposes patterns on the environment in order to maintain a frame of reference for coping with the external world. This is nowhere better illustrated than in the sketch map of a West Brighton woman (Figure 5) who travels everywhere on the Island by bus. Her conception of the Island is scarcely more than a projection of the bus slips of the terminal at St. George, where one uses different ramps, depending on the part of the Island toward which one is headed.

So far as developmental aspects of perception are concerned, Murphy and Hochberg (1951) have provided a similar framework, according to which perception is "a form of continuous adjustment to environmental requirements, involving not simply a...seat of cognitive functions, but the whole organism," which "in coping with its environment, progressively alters its modes of perception and develops more and more complex ones that serve it better" (p. 332, quoted in Fearing 1954, p.62). This conception is directly supported by the complex and generally rather accurate maps of adults who have had considerable experience with most parts of the Island. It is not possible to say that sketch maps which are comparable to detailed commercial maps are simply the result of direct experience which has served to "reduce gross redundancy and bring order to [their] perception of the world" (Hawkins 1966, p. 9). Individuals with such detailed knowledge seem to have integrated information from those commercial maps with information derived from direct experience; they have joined informal with formal learning.

Systems of Orientation.

The literature on systems of orientation has been reviewed recently by Kevin Lynch (1960). A great deal of this rather limited literature depends upon anthropological reports that impress us with the importance of cultural tradition and its variation. The Chukchee of Siberia, for example,

> ...distinguish 22 compass directions, three-dimensional and tied to the sun. They include zenith and nadir, midnight (north) and midday (south), all of which are fixed, plus 18 others which are defined by the sun positions at various times of the day or night, and therefore change with the seasons. This system is of sufficient importance to control the orientation of all sleeping rooms (Lynch 1960: 128).

The Chinese system of using the capital as the high point of the country has been borrowed by the Japanese and Koreans, and is paralleled in England. Thus, whether one is moving north or south, east or west, one goes "up" to the capital, and from Peking, Seoul, (P'yŏngyang in North Korea), or Tōkyō, one goes "down" to all other places in the country. In England this system outraged a Scottish M.P.: "London is arrogant. You are expected to go 'up' to it and 'down' from it" (Steel, 1968). As previously mentioned, the present study grew out of a dispute between a married couple in Eltingville over whether one went "up" or "down" to St. George.

On the island of Tikopia in the Pacific, the system of orientation

> ...is neither universal, egocentric, nor directed toward a base point, but is tied to a particular edge in the landscape. The island is small enough so that one is rarely out of sight or sound of the sea, and the islanders use the expressions [for] inland or seaward for all kinds of spacial reference (Lynch 1960: 129).

The same essential system is found in Hawaii, where toward the sea or toward the mountains is basic (on Oahu the wet and dry sides of the Island also are important points of reference), and very likely something identical or at least similar is found among the island peoples elsewhere in the Pacific.

Being an Island people does not invariably mean that orientation will be in terms of the sea, of course. (We cannot consider Staten Island to be inhabited by islanders in the same sense as people of the Pacific, who are on the high seas as soon as they leave land.) Icelandic orientation is quite different from the Hawaiian or Tikopian system. Einar Haugen (1957), following the lead of Stefan Einarsson, has suggested that Icelandic orientation is either ultimate or proximate. Proximate orientation derives from celestial navigation and can be determined by eye. Under this system, north, east, south, and west correspond to the usual interpretation of the cardinal points. But the same terms are used quite differently when complicated travel routes around the Island render the conventional usages of those terms impractical. Thus one finds such puzzling usages as saying that one is going "south" when one is actually proceeding west, or one may be going "east" while proceeding north. In such cases the terms refer to the quarter of the island toward which one is headed. Because of the winding, twisting, frequently reversing route that must be followed, the designation of the quarter is more meaningful than a simple reference to the cardinal points in the traditional sense. There are further complications in the use of the terms within a quadrant (Haugen 1957).

In the area of experimental work, Warner Brown (1932) found at least three kinds of orientation which developed among blindfolded human subjects placed in a foot maze. Subjects might memorize the order of movements which depended upon proper sequencing; they might use as landmarks information derived from external stimuli, such as rough boards, sources of sound, or the warmth provided by sunlight; finally, subjects might depend upon

> a general sense of orientation in the room space (for example, the solution might be imaged as a general movement around the four sides of the room, with two excursions into the interior (Lynch 1960: 131)

Such experimental studies, of course, have direct relevance for learning theory (supporting simple associative as well as cognitive theories). And, finally, we may note Lynch's (1960) observation that the cardinal points are not particularly relevant for urban dwellers, an observation which is very strongly supported by the present study.

Staten Island in the New York context.

For most New Yorkers, Staten Island is no more than a rustic wasteland across the bay, a quaint bit of the past that no rational person would actually visit. Those who do touch on the Island do so only because they must debark and pass through the ferry terminal at St. George for the return trip to South Ferry, at the foot of Manhattan. It is the scenic ride across New York harbor that they pay their nickel for, and the fact that the vessel touches at Staten Island is incidental. Even the terms of orientation for the ferries, which are two-headed creatures, reflect the point: that end of the boat which is aimed at Manhattan is the bow; that end which is aimed at Staten Island is the stern (Hilton 1964). According to one informant on the Island, a female visitor from Brooklyn came to Staten Island for the first time after the completion of the Verrazzano Bridge in 1964 and expressed complete amazement at the fact that she found not only roads but street lights, electricity, and running water!

The Islanders themselves seem mixed in their feelings about the Island. They self-consciously acknowledge the marvels of The City (New York, Manhattan), but often are very defensive and fiercely proud of the Island. Many older people have remarkably detailed knowledge of the geography and history of the Island and view with regret the present fast growth of population and the sweeping changes that are altering the face and character of the Island.

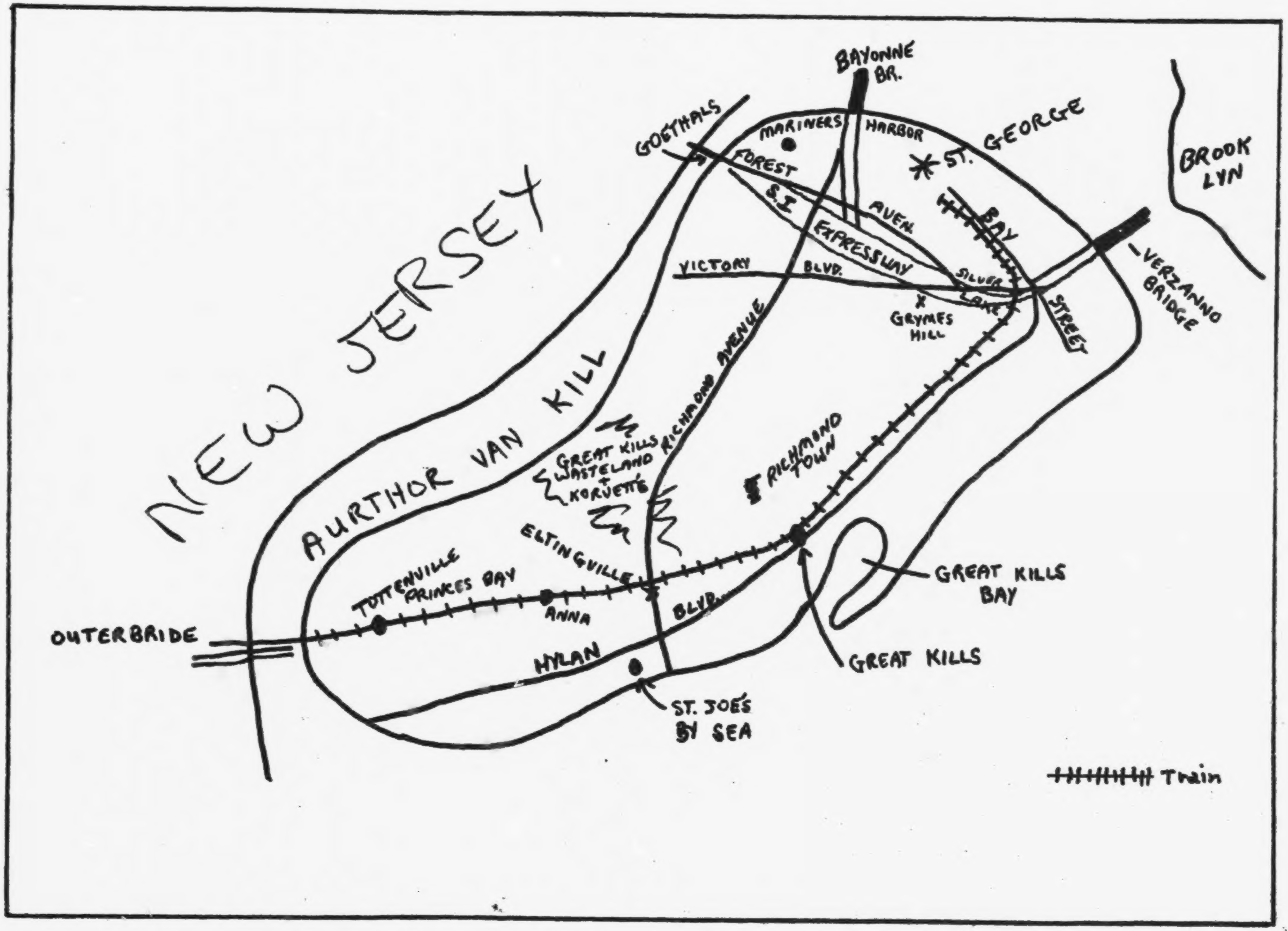

Figure 6. Sketch map of a "proud" Staten Islander. See text.

Even among some of the younger Islanders a show of pride counters a sense of disaffection. One 17-year-old, for example, gave the impression of not caring for the Island, referring in the interview to "bad smells" in certain parts of the Island and to various wasteland areas, yet appended a note to her map (Figure 6) which stated: "I'm not an artist. But I know my Island, and I'm a proud Staten Islander. Thank you." And, indeed, she does turn in a credible production. Possibly her distaste was for what is happening to the Island. New Jersey, for example, is usually blamed for bad smalls (and mosquitoes), while hardly any of the natives in our sample were enthusiastic about the changing face of the Island.

Staten Island presently contains some 300,000 inhabitants (conservatively estimated) in 35 to 50 commumities that still are rather distinct from each other. It has the shape of a warped kite, about 15 miles from approximately north to south, and perhaps eight and one-half miles from east to west at its maximum width. Physically, as may be seen in Figures 1 and 2, it is much closer to New Jersey, with three connecting bridges, than it is to any of the other boroughs of the city. The only bridge on the eastern side, the Verrazzano Narrows Bridge, connects with Brooklyn, whence comes the main flow of newcomers to the Island. The only other way to get to other parts of the city without going first to New Jersey, is by ferry (which carries vehicles as well as foot-passengers). The ferry ride to Manhattan takes from 20 minutes to half an hour, and the drive to downtown Brooklyn can hardly be accomplished more quickly. The drive to New Jersey rarely takes more than five or ten minutes, yet the major identification of most Islanders is toward Manhattan and away from New Jersey. This is less true for residents of the southwestern part of the Island, who frequently shop in New Jersey.

A few of the more dedicated Islanders seem to take pride in not leaving the Island. One informant told us of a resident who has not left the Island in some 37 years, while Arleigh Williamson, the venerable Island representative to the New York City Board of Higher Education was only half jesting when he boasted that with the establishment of both a community (junior) college and a senior college on the Island, it was now possible for a native to progress through all stages of the good life without ever having to step off sacred ground (a favorite statement of his, rendered specifically at the Inauguration of Herbert Schueler as the first president of Richmond College, May 9, 1969).

METHODS

Data collection.

Since the study began with the question of how one learns whether to go up or down on the Island, we had planned at first simply to provide blank outline maps and ask informants to fill them in, after which we would check vertical movement through interviews. We assumed that there would be a map of the Island which would be largely shared by all residents, or possibly by most residents of the given part of the Island. We had no appreciation for the possibility that even the gross shape of the Island would be a highly individual matter, and the idea of providing outline maps was primarily to facilitate processing. Thus when we asked a fourth grade teacher at Public School 45 (Mrs. Phyllis Richards) and a high school teacher at the Notre Dame Academy (Miss Ann Gilroy) to obtain maps of the Island from their students, it did not seem critical that we had not provided them with outline maps. But those preliminary sketch maps, with their great variety and clear developmental implications, led us directly to the question of informal learning and, hence, to the study as it finally came to be formulated

Ultimately we collected 1752 sketch maps, including 97 maps from adults (including Richmond College students) from various places on and off of the Island; 992 maps from three parochial high schools; 594 maps from two parochial elementary schools; 26 maps from public-school fourth graders; and 43 maps obtained outside of the schools from children ranging in age from 6 to 16 years.

The directions for eliciting maps were not as uniform as we had planned, but the departures proved to be instructive for the problem of how informal and formal learning may or may not be joined. Initially, of course, we were interested in seeing what kind of maps would be produced in the absence of a commercial model, but where the overall objectives of the study were imperfectly communicated, the maps show a uniformity that is not apparent in those cases in which we were able to exercise more direct control. The maps which obviously are the products of informal learning were elicited by the following statement:

> Volunteers are asked to draw a rough map of Staten Island, giving as many places as they can, using a plain sheet of eight and one-half by eleven paper. There are no restrictions on the nature of the map--whatever the map-maker wants to put down is all right and there is free choice in the use of pencil, pen, crayon, etc. After the map is completed, just before it is collected, the map-maker should draw an arrow pointing north. Since it may be desirable to talk to some of the map-makers later, each map should show the name, age, grade, address and telephone number of the author on the back, as well as indicating where they have lived on the Island and for how long, and different places off of the Island and for how long. Most maps will be fairly predictable, depending on a number of factors, but some will be different. It is in the case of the unexpected maps that we would be most interested in learning something about the background and experiences of the authors.

All 97 of the adult maps were drawn in response to this instruction, as were 656 high school maps, 155 elementary school maps, and the 43 maps obtained from children outside of a classroom. Some 465 elementary school maps elicited in response to instructions that must have been approximately: "Draw an outline of Staten Island and indicate West (New) Brighton," because all but 44, or about 90 per cent show precisely that and nothing more. The shape of the Island varies as widely as the highly creative spelling, but the essential content is identical for all of them. Of the remainder, 30 show varying degrees of elaboration, most of them indicating only two or three other places; the other 14 were produced by fourth graders who attempted to indicate West Brighton somewhere in New York State (evidently influenced by the fact that they were studying the geography of the state at the time).

The second group of maps which obviously were not drawn in response to the formal directions we had in mind were 336 high school maps done in connection with an art appreciation course. We have been unable to obtain precise information on the instructions actually given, but all of the maps show a remarkable similarity to the commercial maps in general outline and in the placing of communities: some even have the postal zones marked.

In brief, then, 951 maps were drawn in accordance with the general instructions given by us, while 801 were drawn in accordance with two other sets of instructions. As will be seen later, however, these unscheduled departures from the plan provide interesting material for comparing the products of formal versus informal learning.

In addition to the maps, we obtained interviews from 42 high school students, 32 elementary school students, 24 children (ranging in age from 10 to 16 years) outside the classroom situation, and 40 adults, or 138 interviews in all. Adults were asked if they were familiar with the following ten place names to give us an estimate of their overall acquaintance with the Island: Kreischerville (now Charleston), Charleston, Fort Hill, Livingston (formerly Elliottville), Elliottville, Seaside (now Eltingville), Travis (formerly Linoleumville), Linoleumville (formerly Long Neck), Long Neck, and Prohibition Park (now Westerleigh Park). Knowledge of the Island was expected to yield more detailed and more accurate maps, but here again we were in for a surprise that carries implications for the formal/informal learning question.

After determining approximate age, and the length of time each interviewee had lived in which different locales, the interview called for an estimate of the three most desirable and the three least desirable residential areas on the Island, and instructions on how to get from each of the best to each of the worst; finally interviewees were asked to describe how they would get from their present residence to various places on the Island.

The interviews, which were conducted only with current residents of the Island, were primarily to get at the vertical dimension of their cognitive maps, which would not show on the two-dimensional sketch maps. Some of the interviews required as long as two hours, including the time it took to draw the sketch map, and in only one case was less than an hour required. The following is a representative interview, corresponding to the sketch map in Figure 7:

1. Question: About how old are you?
   Answer: 31 years old.
2. Question: How long have you lived on Staten Island?
   Answer: 10 years.
3. Question: Where have you lived on Staten Island?
   Answer: I live in West Brighton now, and before that I lived in New Dorp for five years.
4. Question: Where did you live before you moved to the Island?
   Answer: Roselle, New Jersey
5. Question: If you do not mind being contacted again, would you give us your name, address, and telephone number?

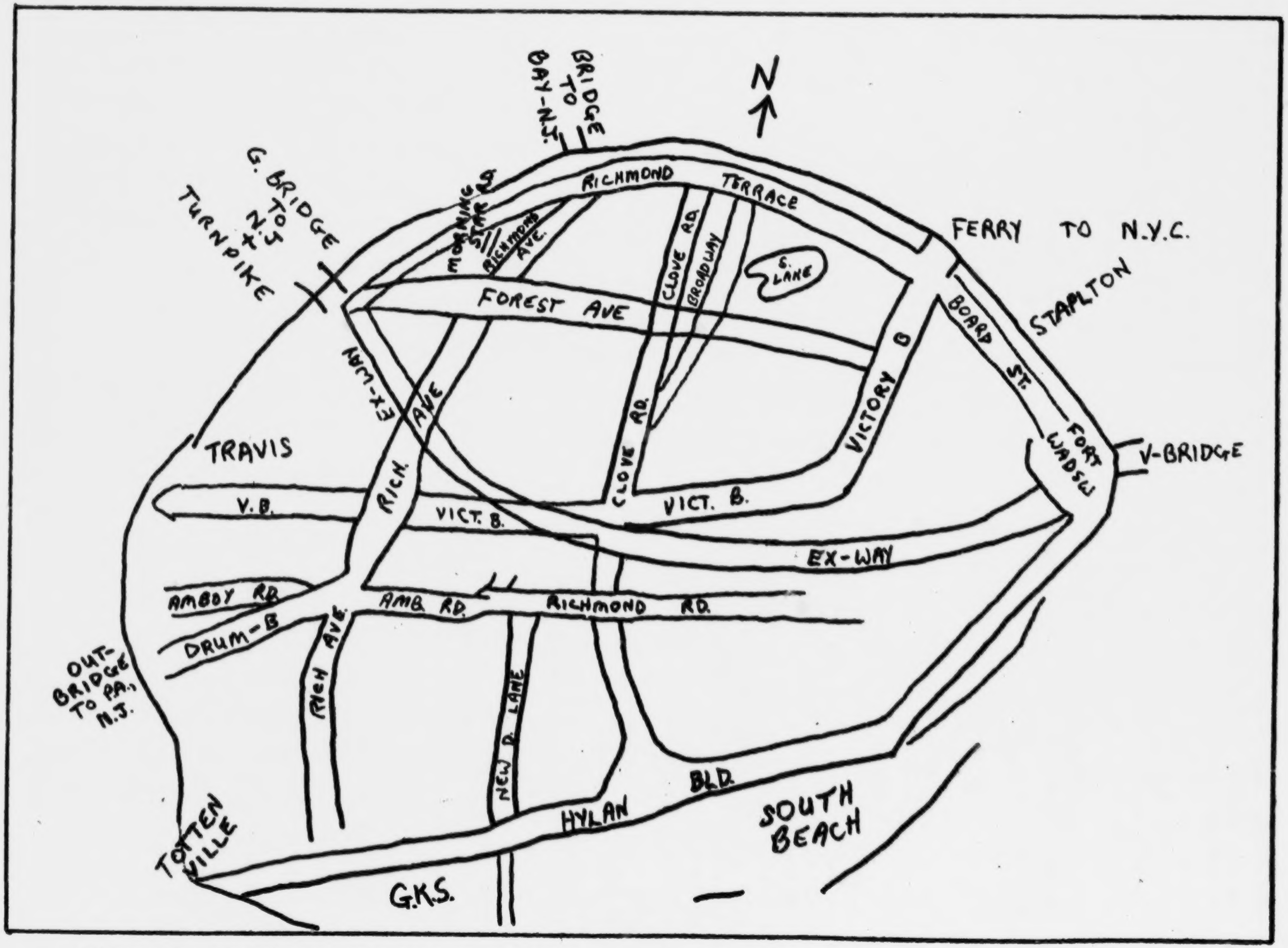

Figure 7. Sketch map of a West New Brighton woman, showing the relative imporance of auto routes.

Answer: Mrs. --- [full information supplied].

6. Question: What are the three best places to live on the Island?
Answer: New Dorp, Todt Hill Road, and Richmondtown.

7. Question: What are the three least desirable places to live on the Island?
Answer: Tottenville, Stapleton, and New Brighton.

8. Question: How would you get from New Dorp to Tottenville?
Answer: New Dorp Lane, turn right on Hylan Boulevard to the end of the Boulevard.

9. Question: How would you get from New Dorp to Stapleton?
Answer: New Dorp Lane, right on Richmond Road, go straight, then left on Targee Street.

10. Question: How would you get from New Dorp to New Brighton?
Answer: New Dorp Lane, right on Richmond Road, left on to Todt Hill Road, straight across over Victory Boulevard, through the park (to the right), then left on Clove Road down to Castleton Avenue; make a right turn and go straight on Castleton Avenue, then turn left onto Brighton Avenue.

11. Question: How would you get from Todt Hill Road to New Brighton?
Answer: Same way as I just said.

12. Question: How would you get from Todt Hill Road to Tottenville?
Answer: Down Todt Hill Road, right on Richmond Road, then make a left to New Dorp Lane; turn right on Hylan Boulevard, go straight down to the end of the Boulevard.

13. Question: How would you get from Todt Hill Road to Stapleton?
Answer: Turn left on Richmond Road, go straight out, turn left on Targee Street.

14. Question: How would you get from Richmondtown to Tottenville?
Answer: Take Amboy Road straight out to Tottenville.

15. Question: How would you get from Richmondtown to New Brighton?
Answer: I'd go over the hill where the golf course is, right on Forest Hill Road, right on Rockland Avenue, left on Seaview Hospital Road onto Manor Road, right on Castleton Avenue, and left on Brighton Avenue.

16. Question: How would you get from Richmondtown to Stapleton?
Answer: Follow the same directions I just gave to Manor Road, then turn right on Forest Avenue, left on Victory Boulevard straight down, turn right on Bay Street.

17. Question: How do you get from where you live *now* to Tottenville?
Answer: Take Floyd Street, turn left on Du Bois Avenue; right on Forest Avenue, left on Richmond Avenue down to Hylan Boulevard; turn right on the Boulevard straight ahead.

18. Question: How do you get from where you live *now* to St. George?
Answer: Take Floyd, turn right on Du Bois Avenue, turn right on Post Avenue, left onto Clove Road, go down to Richmond Terrace, turn right, then straight down to St. George.

19. Question: How do you get to Wagner College from where you live now?
Answer: Take Floyd Street, turn right on Greenleaf; turn left on Forest Avenue, then right on Clove Road; go straight down, then turn left on Howard Avenue to the College.

20. Question: How do you get to Tappen Park from where you live?
Answer: Follow the directions that I already gave for getting to St. George, then take Richmond Terrace onto Bay Street, and on your right is the Park, at Broad Street.

21. Question: How do you get to the piers?
Answer: Take Clove Road Expressway toward Fort Wadsworth. The last exit to the street, then left into Rosebank, but I'm not sure.

22. Question: How do you get to the Empire Theatre?
Answer: Take Floyd Street, then turn right on Du Bois; left on Post Avenue; right on Richmond Avenue; then left on Richmond Terrace.

The woman was not familiar with Prohibition Park, Seaside, Fort Hill, Kreischerville, Long Neck, or Elliottville, but had some familiarity with Charleston, Linoleumville, Travis, and Livingston. Commercial maps vary a great deal in the information they provide, but they seldom include Livingston, Prohibition Park or Fort Hill. Kreischerville, Long Neck, Elliotville, Seaside, and Linoleumville are all obsolete names, but the last two are to be found on some maps, while Charleston and Travis are shown on virtually all of them.

In general, this informant is familiar with the better known contemporary place names but not with the more obscure names. Her interview supports her map, in that both are geared to travel by auto, rather than by bus or train. The use of terms such as "down" provides information on her vertical dimension; "out" implies yet another dimension. And at least half of the map concerns less than the top third of the Island. That is, the map is distorted to the advantage of the areas with which she is most familiar.

Analyses

In general, maps were examined to see to what extent they reflected the shape and cardinal orientation of commercial maps, while interviews were examined to gain an appreciation of relative elevation on the cognitive maps. We had thought originally that different areas on the Island might reflect somewhat different conceptions of what was "up" and what was "down", so we drew composite maps from adults in four areas: North Shore, Castleton Corners, New Dorp, and Eltingville-Annadale, showing the consensus of which parts of the Island are up and which are down. For reasons that will be explained under Dimensionality, we were able to consolidate the four. Figure 8, for example, shows which directions are "down." In addition to the Island as a whole, we examined the vertical dimension for individual neighborhoods, recalling Haugen's (1957) "proximate" and "ultimate" orientations.

Having obtained a general cognitive map of the Island, we were interested in discovering how that conception of the Island developed; to this end we compared the kinds of maps produced by informants of different ages, beginning with children in the fourth grade.

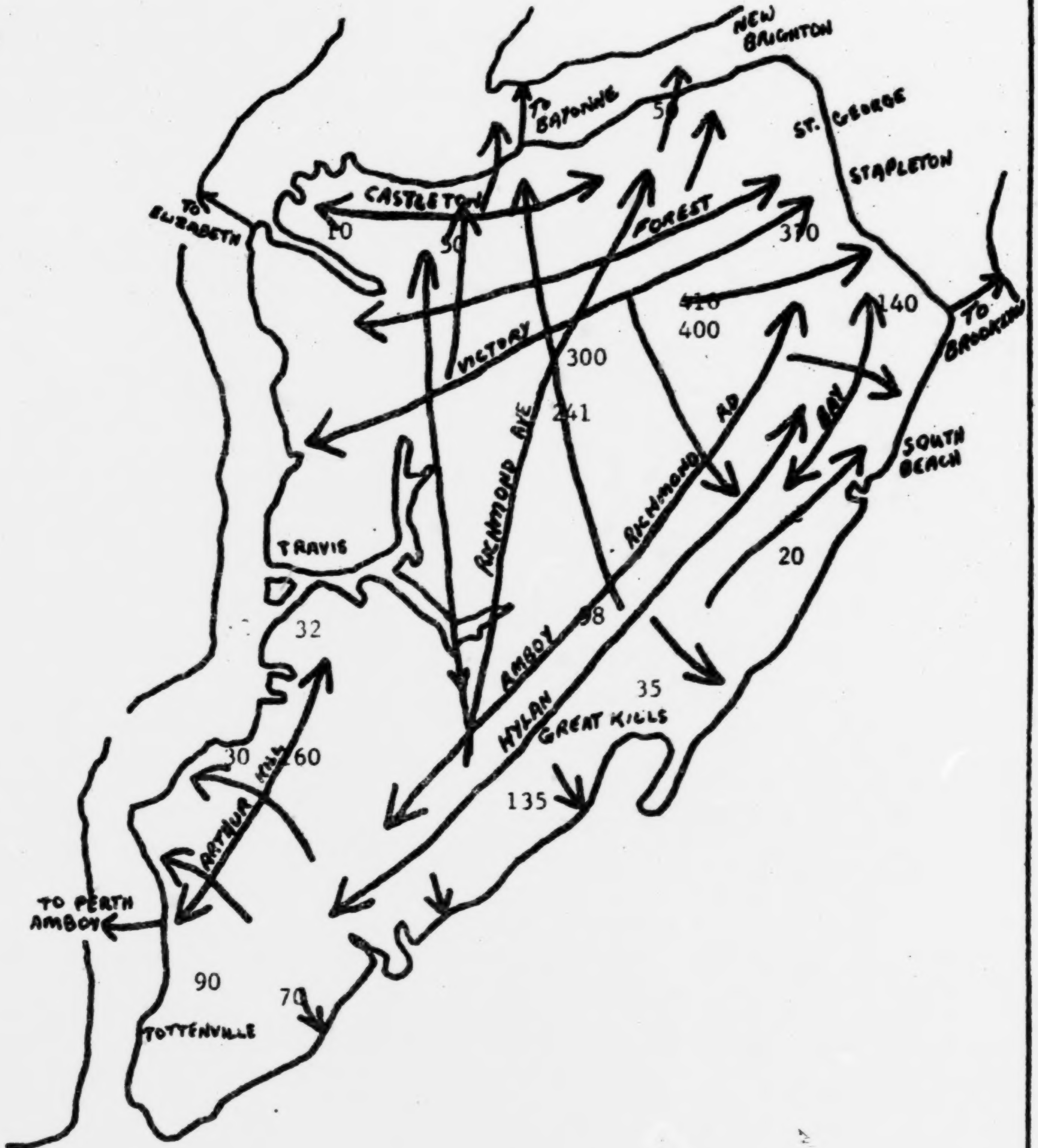

Figure 8. Composite map showing "down" areas of the Island. (Numbers indicate approximate elevatation in feet, after National Geographic map of NYC, 1964)

Maps were sorted typologically to see what differences there were in general orientation, and to see if there were consistent differences in the maps of commuters to the Island and local residents. We were particularly interested to see if orientation would be influenced by the fact that commuters would have to approach the Island regularly (rather than simply to move about on the Island.)

Finally, we sorted the maps on the basis of the kinds of instructions which elicited them: the formal instructions developed by us; the apparent instruction to integrate New York State geographical information into sketch maps of Staten Island (this was a subset of more general apparent instructions to draw an outline of the Island and indicate the West Brighton neighborhood); and maps which evidently were drawn on the understanding that their "artistic" (i.e., copying) ability was to be evaluated.

RESULTS

The initial impetus for the present study was a dispute between a native Islander and her husband in Eltingville over the question of whether one went up or down to St. George, but as soon as we saw the first sketch maps our attention turned from considerations of whether, perhaps, different socioeconomic areas were up or down (i.e., whether elevation terms reflected differences in the prestige of different residential areas), to the more general question of how one forms an effective map of the Island. This in turn finally became a problem in informal learning.

Since many of our informants speak of the three or four dozen communities on the Island as being distinct, we had expected that overall conceptions of the Island might vary by community. We know, for example, that most Islanders go to Manhattan for "serious" shopping and entertainment, while a considerable number of people in the South Shore area, particularly from Annadale to Tottenville tend to go more frequently to New Jersey. It seemed reasonable to think that this sort of difference might be reflected in the maps. What we had not anticipated was the amount of moving around that most people have done on the Island. See Table One for example.

TABLE ONE
Sample of Number of Areas Adults Have Lived In

Current Residence	Total	Nr. Island Communities Lived In.					
		1	2	3	4	5	6...9
St. George to New Dorp	9	5[a]	3				1
Castleton Corners	11	3[b]	1	3	1	2	1
Eltingville-Annadale	10	4[c]	2	2[d]	1[e]	1	
New Brighton to Mariner's Harbor	10	3	3	3[f]	1[g]		

[a] Includes one non-native; [b] includes 2 non-natives; [c] all non-natives; [d] includes one non-native; [e] non-native; [f] includes 1 non-native; [g] non-native.

As Table I shows, well over half the residents have lived in more than one neighborhood. The native residents have lived in nearly 2.7 neighborhoods, the immigrants have lived in about 1.8 neighborhoods, while the sample as a whole has lived in about 2.5 neighborhoods on the Island. Eighteen per cent of the sample (7 adults) consists of individuals living in their first neighborhood since coming to the Island from outside (mostly from Brooklyn and mostly since the completion of the Verrazzano Narrows Bridge five years ago). In general, then, we may say that most adult natives of Staten Island have lived in at least two different neighborhoods on the Island, and many have lived in three or more. An earlier sample of 21 adult residents had lived in an average of 3.3 communities. As might be expected, the older a resident is, the greater the likelihood that he has lived in several areas. Such shifting of residence should reduce the number of distinctive local conceptions of the Island and, indeed, while there are several characteristic orientations, it is by no means the case that the maps are products of individuals who have spent their entire lives in a single community.

Among the younger informants, 138 native Island girls at St. Joseph By The Sea High School have lived in a single neighborhood; 113 have lived in two neighborhoods, 32 have lived in three; eight have lived in four; and one has lived in five neighborhoods. That is, slightly over half have lived in two or more different neighborhoods on the Island. Again, among the non-native residents who attend the same school, 228 have lived in a single community; 46 have lived in two; 12 have lived in three; and three have lived in four neighborhoods. The pattern, then, is about the same as for the adults, with the sort of modification we might expect from the fact that they are younger and have had less opportunity to move.

In general we may say that there is no orientation which is peculiar to a given area of the Island, and we may say that for immigrants there is little correlation between length of time on the Island and the quality of the maps which they produce. Some relative newcomers (one or two years) draw rather accurate and detailed maps; some who have been here many years draw maps which are best described as "primitive." But the same statement can be made for native residents, so far as quality is concerned, except that some older natives stand out for the detail of their general knowledge of the Island, which knowledge is reflected in their maps. There is an important difference, however, in the maps produced by natives and those produced by residents who have come to the Island as young adults, a difference which is most strongly supported by commuters from Brooklyn. This difference may be characterized as the proportion of maps showing what we call a "Brooklyn" orientation.

Major orientations

The standard orientation corresponds essentially to what we should expect to find on a regular commercial map, with north toward the top of the page and Tottenville toward the lower left-hand (southwest) corner. Within this very general orientation, however, there are considerable variations in shape. In Figure 9, for example, the approximate shape of the Island is preserved, though there is a moderate rotation that places Tottenville (including the Billopp House) directly south instead of southwest. Similarly, the Verrazzano Narrows Bridge and the New York ferry are shifted more directly north. The

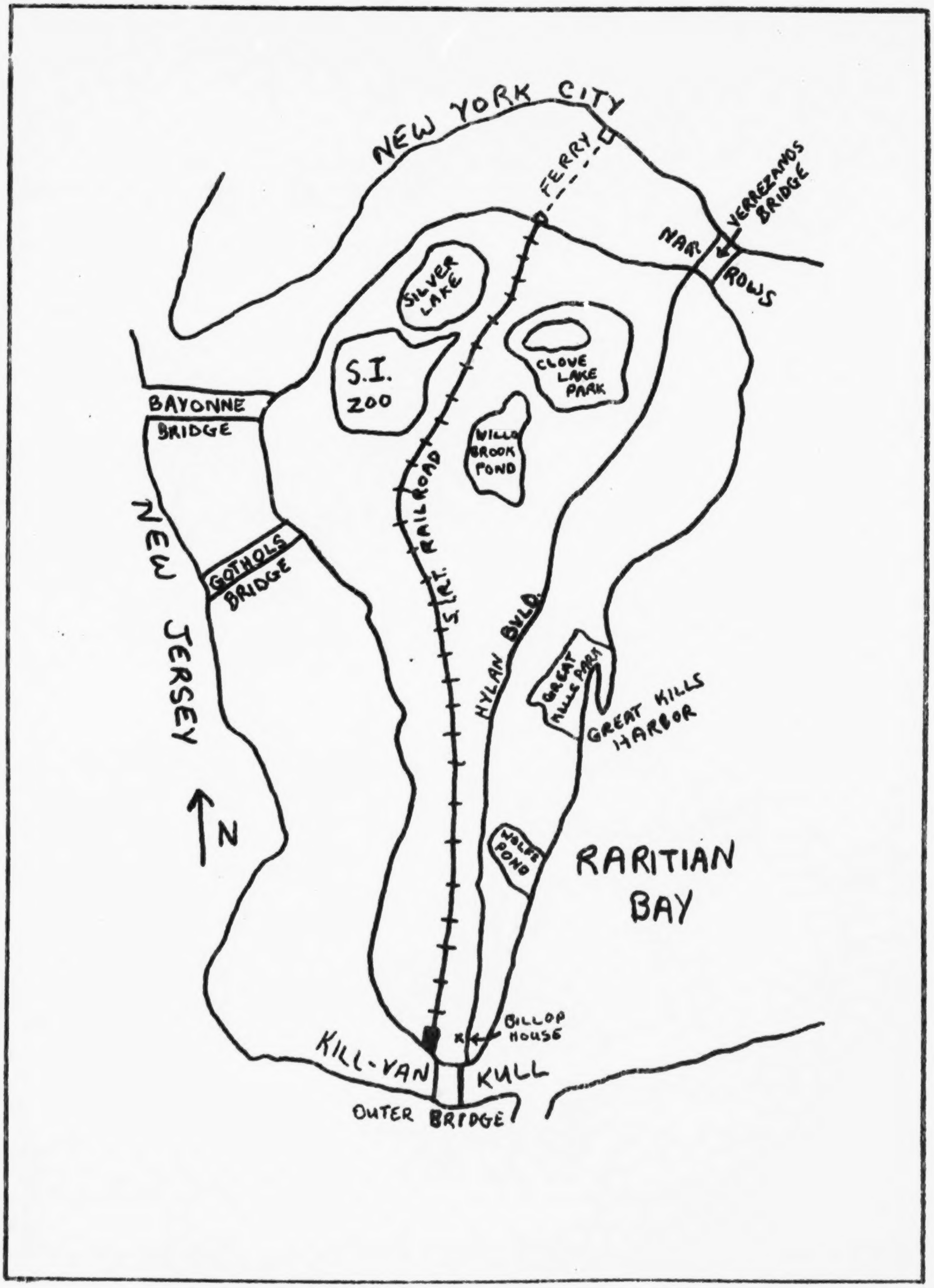

Figure 9. Standard orientation revealed in map of Tottenville sixth-grader. See text.

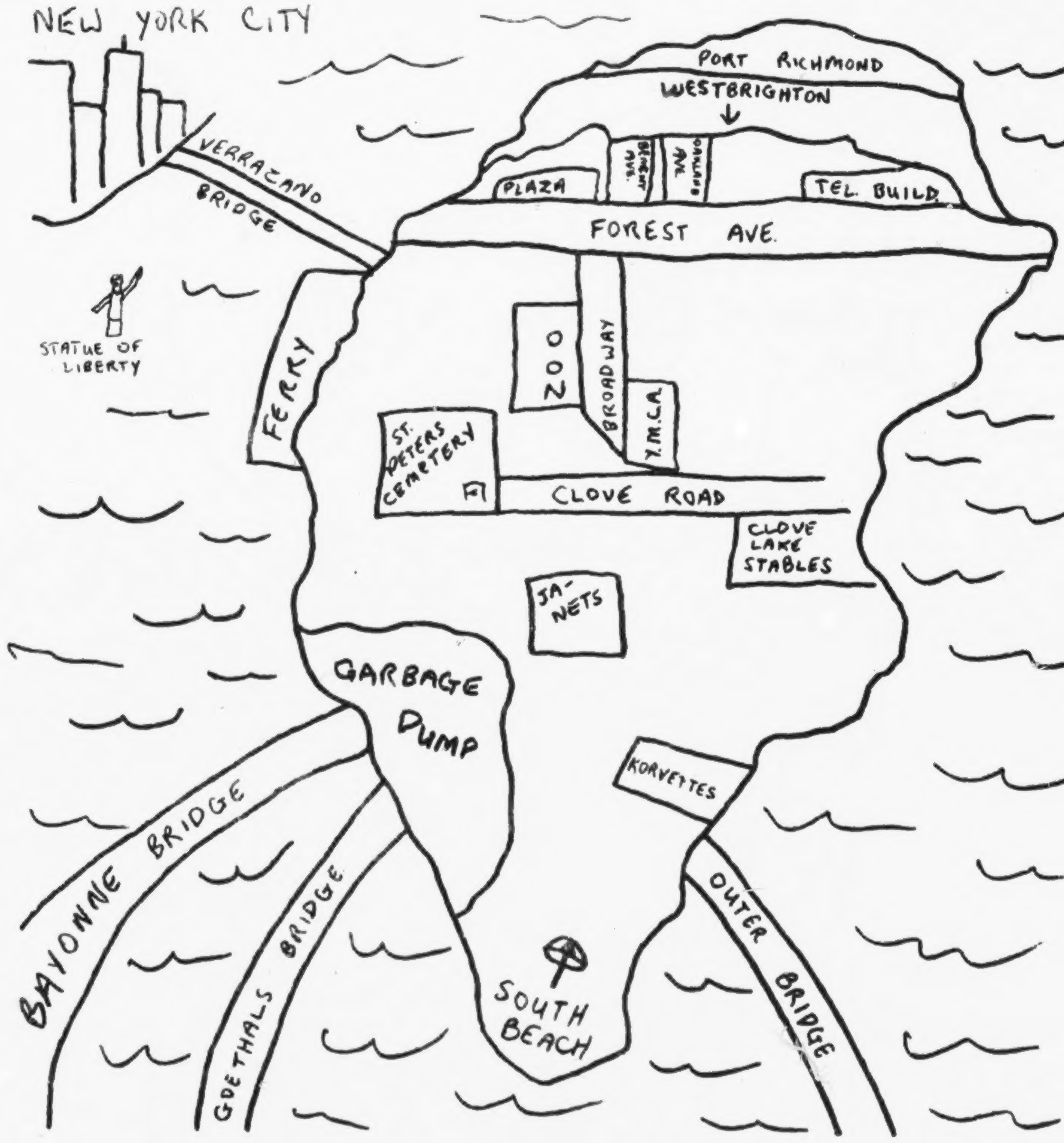

Figure 10. Neighborhood map placed in Staten Island context.

Bayonne and Goethals Bridges are drastically overshifted (compare Figures 1 and 2), but they stand in proper relation to each other. The Great Kills area is well placed and in proper relation to Wolfe's Pond Park. Silver Lake, Clove Lake Park, the Zoo, and Willowbrook Pond are at least in the proper general area. The Staten Island Rapid Transit (SIRT) train route and Hylan Boulevard are placed far to the righthand side, but all in all it is not a bad representation of the Island. The youngster has been in Tottenville for about a year and a half, having spent his first nine and one-half years in Brooklyn. His class has had some instruction on the Island and the State, effective instruction, to judge by the general character of the map. He uses the train only to go between Tottenville and St. George; he remarked that he could see water at either end of the line (but, presumably, not throughout the trip), which may account for his placing of the line more or less down the center of the Island. Other travel seems to be primarily by auto, to Korvettes (in New Springville) or to New Jersey. Hylan Boulevard is important for him, as are Amboy Road and Richmond Avenue even though they do not appear on his map.

Figure 10 was drawn by a 13-year-old native of the West Brighton neighborhood. It, too, is a standard orientation, though with some interesting features. Except for the mention of "Outer Bridge" (the Outerbridge Crossing to New Jersey was named after Eugenius H. Outerbridge), her map only deals with the top or northern, half of the Island. Moreover, it is essentially the West Brighton/Port Richmond area that is depicted. From the telephone building to the plaza is not more than two miles, and from the intersection of Forest and Broadway to the Clove Lake Stables is perhaps a mile. In other words, her map deals with her own neighborhood placed somewhat arbitrarily in an Island context. The Verrazzano Narrows Bridge should be represented on the opposite side of the Island and it actually connects with Brooklyn rather than with Manhattan (New York City). Of course the ferry and the other bridges are also displaced. One can go to the end of Forest Avenue and gain access to the Goethals Bridge, about where she shows the Verrazzano Bridge. Korvettes is actually pretty much in the center of the Island, about where Ja-Nets is indicated (it is roughly on the other side of Richmond Avenue from Korvettes). South Beach apparently is depicted where it is because the name implies that it should be at the "south" end of the paper. In brief, the "real" part of her Island world, including those areas where she spends most of her time, are realistically depicted, while the remainder of the Island is largely ignored or distorted. The odd placing of the exits and the placing of Korvettes we call reversals, and when there are many reversals of this sort we speak of mirror maps (discussed below).

Figure 11 is rather an extreme variety of the standard orientation maps. The girl who drew it lives and attends school (8th grade) in Tottenville, but previously lived at Mount Loretto (7 months), Graniteville (northeast corner of the Island, 2 months), and two years in West Brighton before coming to the Island from the Bronx at the age of nine and one-half years. The shape of the Island seems a bit arbitrary but the general orientation is correct and the placing of the various communities and landmarks is relatively accurate. She conceives of the Island pretty much as depicted, with all relevant communities on the edge. The eastern edge, from Tottenville to South Beach may be

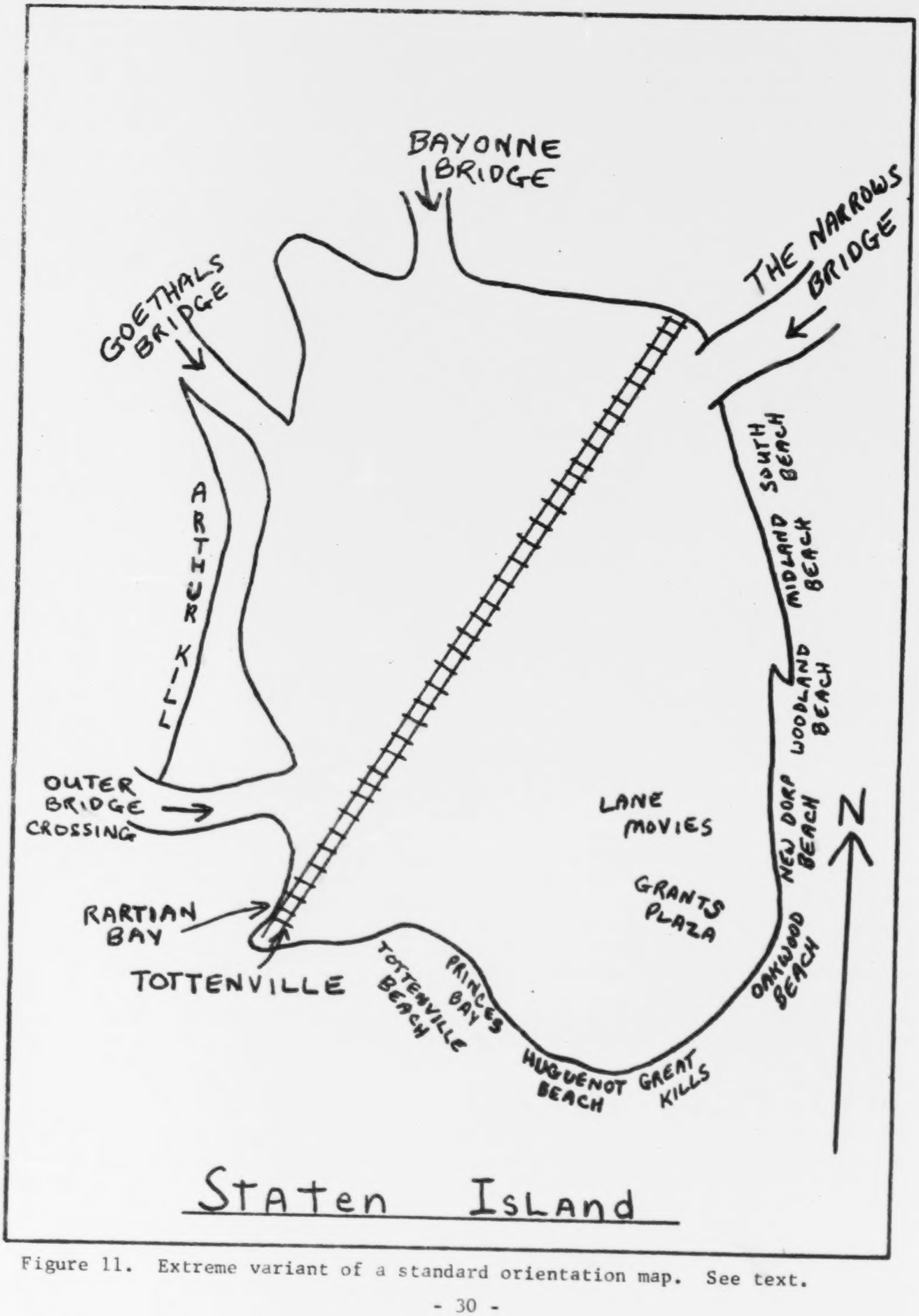

Figure 11. Extreme variant of a standard orientation map. See text.

an exaggeration of the curves in Hylan Boulevard which she takes fairly often to Grant's Plaza to shop. She takes the train to New Dorp, but the route is perfectly straight. It is not uncommon to see the train route depicted this way, but in this case it is mildly puzzling because it actually passes through more or less the same communities she shows lying on the great curve, though far enough inland to provide less visual contact with the water than is possible from the bus on Hylan Boulevard.

The girl who drew the map in Figure 11 thinks of the North Shore in a generally negative way: the St. George area is mostly slums and West Brighton is mostly empty lots, while the Tottenville area is thought of as consisting mostly of houses. Even though she lived in West Brighton for two years, it is not shown on her map. And the North Shore area is "down," while Tottenville is "up." Within the immediate neighborhood her use of vertical terms is not obvious. She goes "up" to school, for example, even though she lives very nearby and the walk does not appear to involve any change in elevation. She was unusually nervous at the interview, seemed reluctant to answer questions, and was unable to suggest why she used "up" and "down" the way she did.

Among the 844 maps which were elicited by the "official" instructions and for which we had adequate background information, 320 (38 per cent) were approximately like Figure 9, with the different areas standing in reasonable relation to each other and representative parts of the Island are indicated. That is, there is evidence that the Island as a whole enters into the cognitive map. On the other hand, 90 maps (11 per cent) were more like Figure 10, in which the home neighborhood is rather artificially placed in an Island context. These at least suggest an awareness that the Island consists of more than the neighborhood, and they contrast with the 51 maps (six per cent) which simply show a neighborhood with no indication that there is more to the Island. These are mostly provided by the younger children and are discussed in some detail under Developmental aspects.

We mentioned reversals in connection with Figure 10, though we have not included it among the mirror maps, because the principal characteristic of Figure 10 is its neighborhood quality. There were 33 maps (four percent) with enough reversals to make the mirror aspect distinctive. A representative mirror map is shown in Figure 12. This was drawn by a 15-year-old West Brighton girl who attends St. Joseph By the Sea, a high school near Huguenot Beach and northeast of Mount Loretto. To judge by her map, one might expect that she depends on the train to get to school, but she goes by bus. Most of the bus route lies on Hylan Boulevard, which is not even depicted on the map. She does use the train to go to Great Kills, however, first taking the bus to the ferry terminal (which is also the St. George end of the line for the train).

The general shape of the Island in Figure 12 is slightly stylized, perhaps, but recognizable, and the north-south orientation is preserved, with "N" pointing toward St. George, even though St. George has been placed on the "wrong" side. The southwest communities--Tottenville, Huguenot, Annadale, and Great Kills--are in their proper relationship, but are shown toward the west rather than toward the east. Similarly, St. Joseph By The Sea and Huguenot Beach would be more suitably placed above Mount Loretto, which is not given a mirror representation.

It is difficult to account for most of the reversals in Figure 12, particularly those toward the bottom of the map, except by suggesting that east-west relationships are not particularly relevant while north-south is more relevant, which assumption is supported by the appropriate placing of the several communities in this respect. The ordering of communities at the top of the map is more complicated. The reversals are not consistent, for example. New Brighton is between St. George and West Brighton, while Port Richmond is still more distant from St. George. Some hint may be obtained, however, of how the ferry terminal becomes so severely displaced. Another informant from the West Brighton area phrased the problem this way:

> Since from my house I can see the Jersey shore from the third floor room, when I go to St. George on the Forest Avenue bus, I visualize St. George as being in that portion of the Island close to the Jersey shore, since, when Forest Avenue converges into Victory Boulevard the bus makes a sharp left turn and continues on this course in what appears to be more or less a straight downhill direction. Moreover, when the bus arrives at Victory and Bay, it again turns left in the direction of the St. George ferry. I was very shocked (after living in the area for a year) to discover that the Doctor's office (Staten Island Medical Group on Victory Boulevard near Cebra) is in Tompkinsville because I visualized the latter as being way off somewhere in an easterly direction, and I don't feel I have traveled in an easterly direction, but rather in a northwest direction.

Part of the difficulty in this account stems from the fact that the "Jersey shore" is usually thought of as corresponding to that part of New Jersey which is across Arthur Kill from the area between the Goethals Bridge and the Outerbridge Crossing (with direct north-south extensions, of course). That is, the Jersey shore is generally west of Staten Island, but in the present case the West Brighton woman is looking at Bayonne, which is directly north of her home. Thus her cognitive map is rotated 90 degrees from a cardinal orientation. Whereas her bus starts in an easterly direction and curves north toward the St. George terminal at the northeast corner of the Island, in her mind the bus starts in a northerly direction and curves west. In this case the difficulty stems from not discriminating that part of the New Jersey shore which lies to the west from that part which lies to the north.

One of the commoner displacements on essentially standard orientation maps is the shifting of Port Richmond from the middle of the North Shore toward the middle of the Island on the western shore, roughly

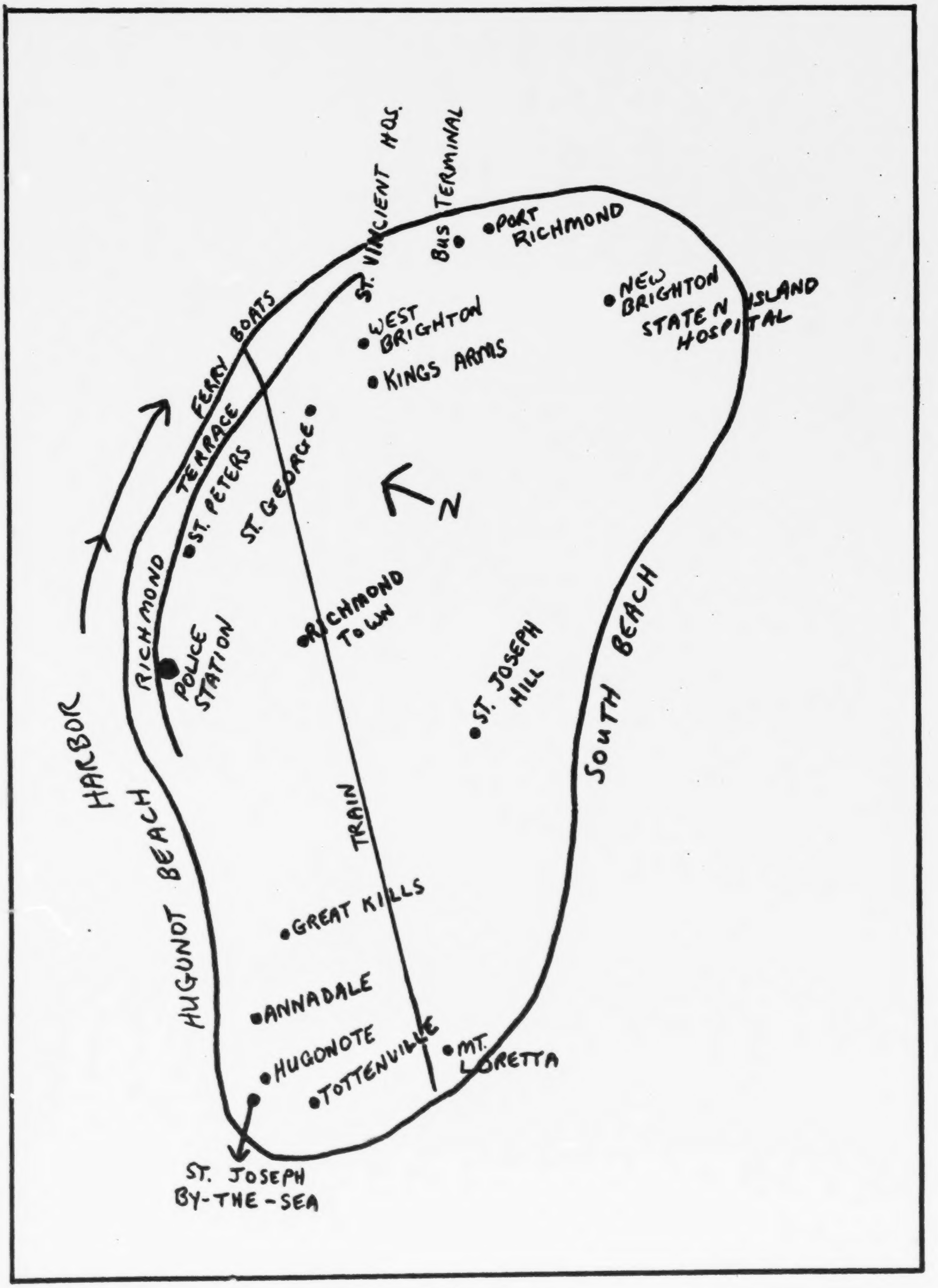

Figure 12. Representative "mirror" map.

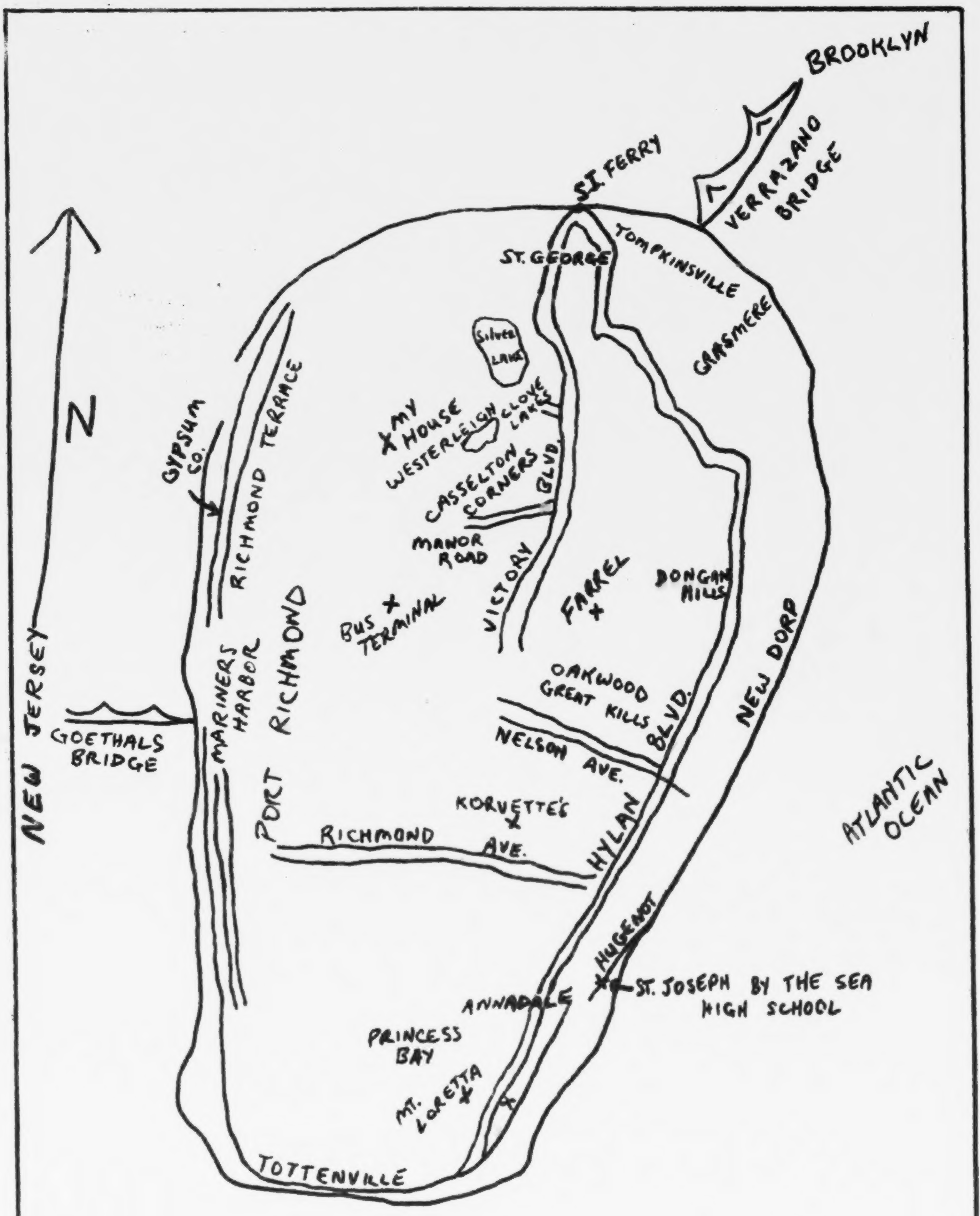

Figure 13. Standard orientation with North Shore displacement. See text.

across the Island from Eltingville or Great Kills. Figure 13 shows this displacement and provides an important clue for the understanding of how the distortion comes into being. Port Richmond has long been an important shopping center on the Island, though the relatively new centers at Grant's Plaza (New Dorp) and Korvette City (New Springville) get a great deal of the custom today. At any rate, from several sections of the Island the easiest way to get to Port Richmond is via Richmond Avenue, whether by auto or by bus. As Figure 13 shows, Richmond Avenue begins at Hylan Boulevard in Eltingville and heads approximately across the Island but soon begins a very gradual curve toward the north. If one simply gets on the bus at Hylan and gets off in Port Richmond, he has gone in what is psychologically a straight line, pretty much the way many commuters conceive of the train as going in a straight line. Figure 13 shows Richmond Avenue proceeding directly "west" toward Port Richmond, but one could argue that so long as the route is conceived as a straight line it could as easily be thought of as running north-south as east-west (or directly toward the North Shore from Eltingville, at any rate). That is, the railroad route involves curves which have been cognitively ironed out just as the bus route has, but this does not result in a shifting of locations in the same way the bus route seems to. In the present case it would appear that something of the character of the east and west sides of the Island contributes to the greater distortion toward the west. First, the train stops at each community in its southwesterly route between St. George and Tottenville, possibly helping to maintain the psychological distance between points along the line. Similarly, if one follows Hylan Boulevard there are abundant landmarks along the way. On the other hand, there is no artery that runs the length of the Island on the New Jersey side; the western third of the Island is rather sparcely populated and is generally considered to be unattractive. The result seems to be that the "irrelevant" part of the Island disappears, with the North Shore collapsing toward the south. In this sense Staten Island is two-sided, rather than triangular, analogous perhaps to the way Boston is one-sided, losing "precision and content as one moves away from the Charles River edge" (Lynch 1960: 20). Also, with reference to Boston, Lynch (1960) observes:

> One of the most interesting districts is one that isn't there: the triangular region between Back Bay and the South End. This was a blank area on the map for every person interviewed. even the one who was born and raised there. It is an area of substantial size containing some known elements such as Huntington Avenue and occasional landmarks such as the Christian Science Church, but the matrix in which these might appear is absent and nameless. Presumably, the blocking by surrounding railroad tracks, and the conceptual squeezing-out of this area because the main streets of Back Bay and the South End are felt to be parallel, both contribute to this disappearance. (p. 20)

The disappearance of considerable areas from cognitive maps needs further study, but we may note that essentially the same thing happens for all irrelevant areas. Thus in Figure 10, where a neighborhood is placed in an Island context, almost the whole Island disappears. The point will become even more obvious when we discuss the maps of fourth-graders, below under Developmental aspects.

In brief, then, more than half of the maps elicited by the formal instructions show an approximation of the standard orientation to be found in typical commercial maps, but usually there are modifications that go beyond the amount of detail included in the sketch maps. There are reversals, which yield mirror images, with east-coast communities shown in the west, or exits to New Jersey facing Brooklyn. In such cases it appears that the north-south sequencing of communities remains relevant, perhaps because the principal transportation routes, including the train, run in that direction. Of course there is a bias in the sample, since we are speaking of maps that depict the northern and southern extremes of the Island. Maps which show other major orientations have their own distinctive variations.

Beside the mirror maps, the standard orientation sample includes maps which are primarily concerned with a single neighborhood which is rather arbitrarily placed into a Staten Island context. These imply that the neglected parts of the Island are not particularly important for the informants concerned, though it is clear from the interviews that familiar areas and well-traveled routes may be omitted from the sketch maps.

Finally, the maps contain distortions that seem to derive, on the one hand, from confusing paths and mistaken landmarks, as in the case of St. George appearing at the wrong end of the North Shore; and, on the other hand, the disappearance of much of the psychologically vacant western section of the Island results in a collapsing of the western part of the North Shore (the Port Richmond/Mariner's Harbor area) toward Tottenville in the southwest corner of the Island.

The North Shore orientation is the label we have given to maps showing a north-south reversal. In these cases the North Shore communities are shown at the bottom of the map, nearest the artist, and Tottenville and other southern or southwestern communities are placed at the top of the page. It is as if the artist pictured himself standing at St. George and looking toward Tottenville, while the commercial and standard orientation sketch maps imply that one is standing at Tottenville and looking toward the North Shore.

Nearly all of these maps bear a superficial resemblance to the standard maps because the general shape of the Island is the same, with the narrow end at the bottom of the paper (Figures 14 and 15) and the wide end at the top. But the arrangement of communities and landmarks is typically reversed from north to south and frequently from east to west. Thus in Figure 14,

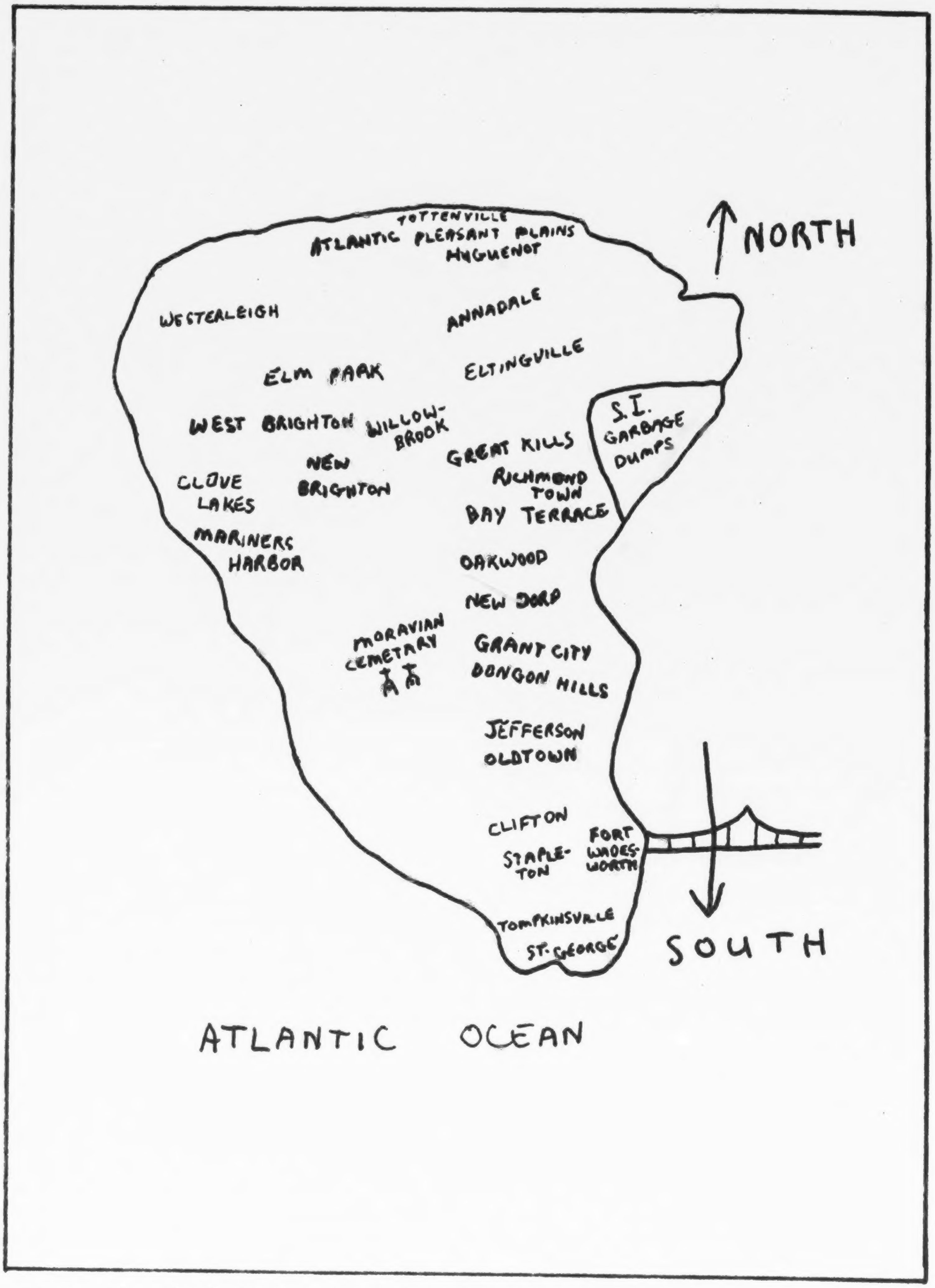

Figure 14. North Shore orientation with reversals. See text.

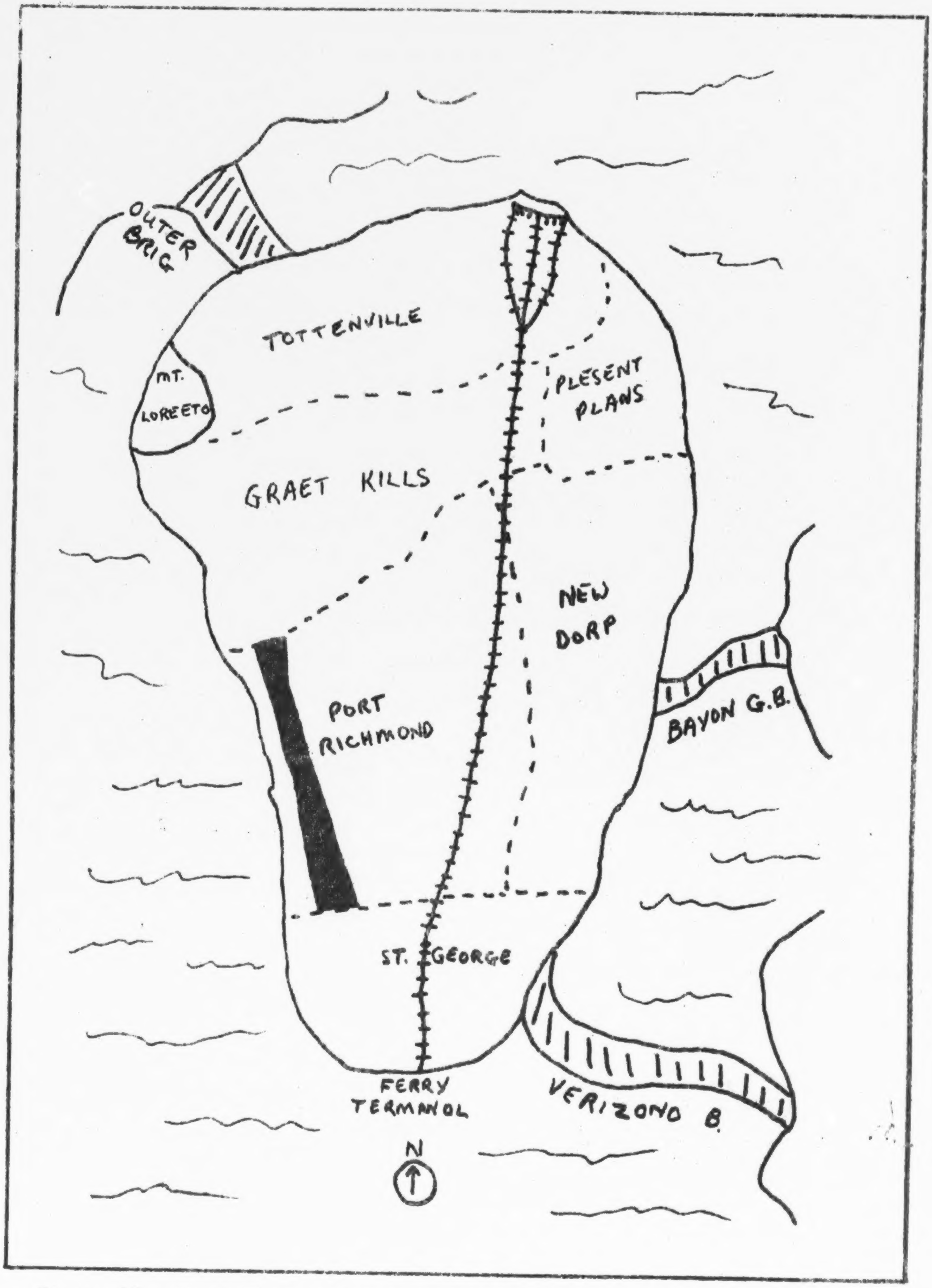

Figure 15. North Shore orientation of Tottenville sixth-grader.

which was produced by a high school junior who has lived all of her life in Great Kills and Dongan Hills, the communities St. George/Tompkinsville/ Stapleton...Great Kills/Eltingville/Annadale...Tottenville are all stops on the train and conform well to outline of the Island except that they are in perfectly reverse order. That is, on the standard orientation maps, New Dorp, Oakwood, etc. are toward the righthand edge of the map, and they are here, as well. But if one were really standing at St. George looking toward the other end of the SIRT line, those places would be toward the left hand edge of the map. Evidently what has happened is that the informants have had occasion to examine commercial maps frequently enough to learn the gross outline of the maps and to learn that the point is approximately south. In the present exercise they have been required to join information from "official" maps and information derived from their own experience. The placing of communities and landmarks is quite arbitrary, so far as the outline of the Island is concerned. And the designation of "north" and "south" is also artificial since these terms are related to the shape of the Island but are just the opposite so far as the relationship of the communities is concerned.

Further confusion of "official" information and information derived from experience is shown in both sample figures. Both have the Verrazano Narrows Bridge in about the same place, though it is not labeled in Figure 14, and the placing makes sense in terms of the nearby communities, but it makes no sense so far as the shape of the Island is concerned, and it is, again, on the "wrong" side of the Island. The placing of the Moravian Cemetery is reasonable, since it is inland and in the New Dorp/ Dongan Hills area, but most of the other places shown are either arbitrarily placed (implying a lack of precise knowledge of their locations) or conform more to their placing on a standard map. If Westerleigh and Elm Park were reversed, they would fit quite nicely on a standard map, so far as their relation to the shape of the Island is concerned; Willowbrook, too, would be reasonably placed. Mariner's Harbor could be seen as showing the same distortion that appears on the standard orientation maps as a result of the disappearing western sector of the Island. But the placing of Clove Lakes, West Brighton and New Brighton seems quite arbitrary, related neither to the shape of the Island nor to the arrangement of nearby communities, except that they are vaguely "North Shore."

Figure 15 was produced by a sixth-grader who has lived most of his life in Richmond Valley (near Tottenville). Evidently he has fused the Bayonne and Goethals Bridges, both of which would be more accurately placed near Port Richmond than near New Dorp. The placing of Mount Loretto and Great Kills would be reasonably good if one were standing at St. George and looking toward Tottenville, but everything else is reversed. This youngster thinks of Tottenville as being the beginning of the Island, while St. George is at the end. He sometimes takes the train to the end (St. George) or to the "Richmond Plaza Station." Since the North Shore train has not been running during his lifetime, he may have confused the Richmond and Grant Plazas. If this is, indeed, the case, then his placing of Port Richmond eliminates a reversal and makes sense with respect to Great Kills. That is, Grant's Plaza is just beyond Great Kills as one goes toward St. George.

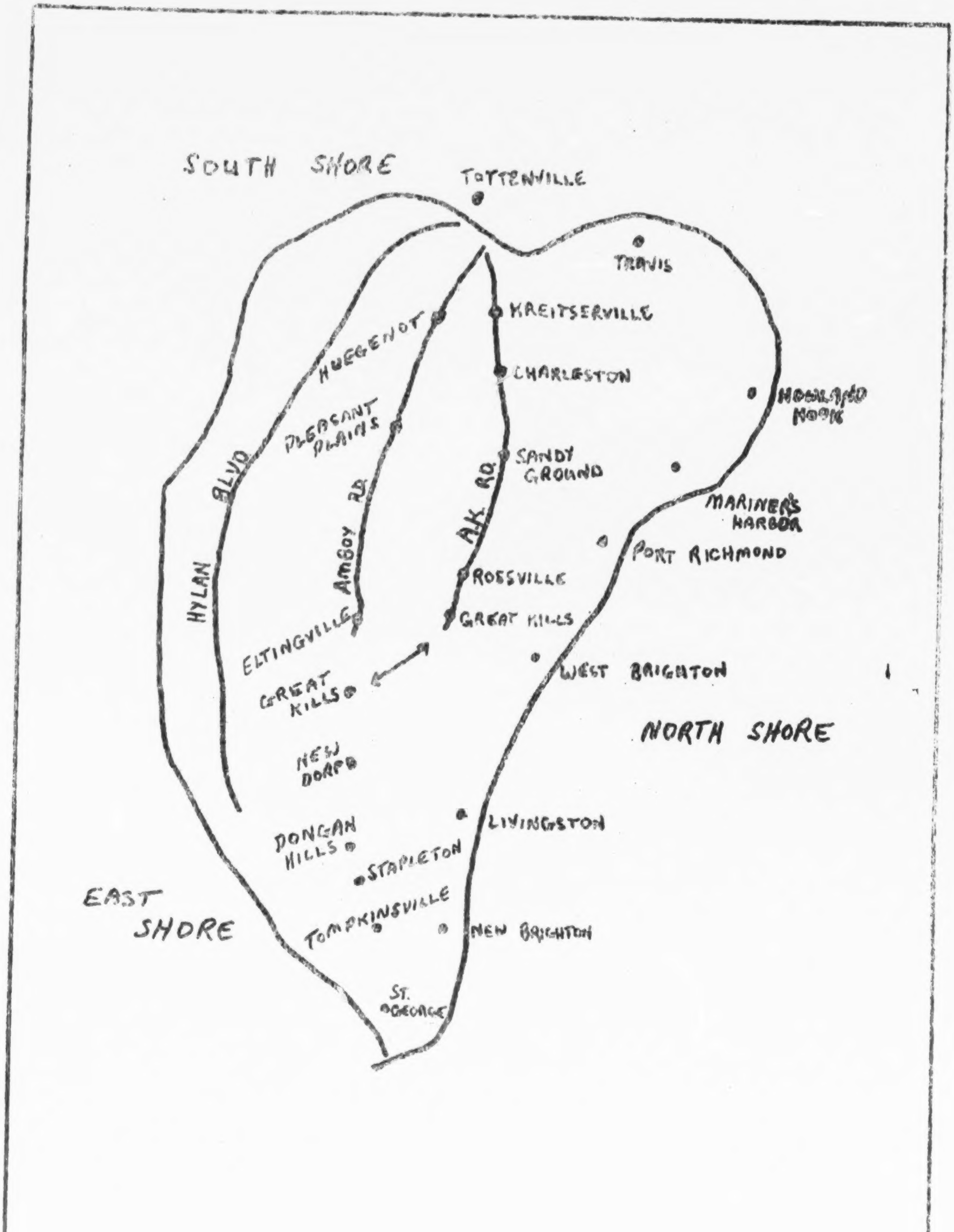

Figure 16. North Shore orientation without reversals. See text.

Of the 82 North Shore orientation maps, only one is simply a standard map turned upside down. The map was never completed, and there is no way to eliminate the possibility of consultation with printed reference materials. This is unlikely, however, since no commercial map that we have seen shows such an orientation. The other North Shore maps are similar to Figures 14 and 15, but a few were like Figure 16, where there are no east-west reversals to speak of. That is, the map is drawn as if one were standing at St. George and looking toward Tottenville, though the shape of the map implies a standard orientation. The arrangement of communities is quite accurate and detailed and correspond closely to the cardinal points as implied by the labels for East, South, and North Shores. But, again, the western sector tends to disappear, and the relative distance between Mariner's Harbor-Travis-Tottenville is far too little. There is some distortion for the communities along the train route, implying that they are located inland rather than essentially toward the shoreline facing Brooklyn (his East and South Shores).

Figure 16, then, even though drawn by a very senior resident with a detailed familiarity with the communities on the Island (note the inclusion of Kreischerville, Sandy Ground, and Rossville, for example), shows distortions which result from trying to fit knowledge derived from experience into an artificial bit of formal knowledge (i.e., knowledge of what the shape of the Island "really is," based on commercial maps).

While standard orientation maps are produced by residents from various parts of the Island, they seldom appear in the maps produced by non-residents. Similarly, the North Shore orientations are peculiar to residents, but not to any particular part of the Island.

The Brooklyn orientation refers to maps which show the Verrazzano Narrows Bridge toward the bottom of the paper, St. George toward the right, and Tottenville toward the left (Figure 17). This orientation, which involves a 90-degree rotation clockwise from standard maps, was first observed on maps produced by students who attend high school on the Island but who commute from Brooklyn via the Verrazzano Narrows Bridge. Somewhat later the same orientation was seen on maps produced by Richmond College students (at St. George) who commute from other boroughs, usually reaching the Island by ferry. Excluding the first group mentioned above (because we lack suitable background information), there are 197 maps with this orientation. This includes 82 per cent (42 of 49) of the non-residents in the sample, while 145 residents showed the orientation. Here it should be noted that 70 of the current residents formerly lived in one of the other boroughs (most are from Brooklyn, ultimately). Thus only 75 of the 197 "Brooklyn" maps (about 38 per cent) were produced by individuals native to the Island.

Figure 17 shows a relatively moderate rotation, but was produced by a 15-year-old girl who has lived her entire life in Brooklyn and commutes to St. Joseph By The Sea high school. It is a most economical map, showing the important landmarks in good relationship to each other. Figure 18 was produced by one of her classmates and captures more clearly than any other

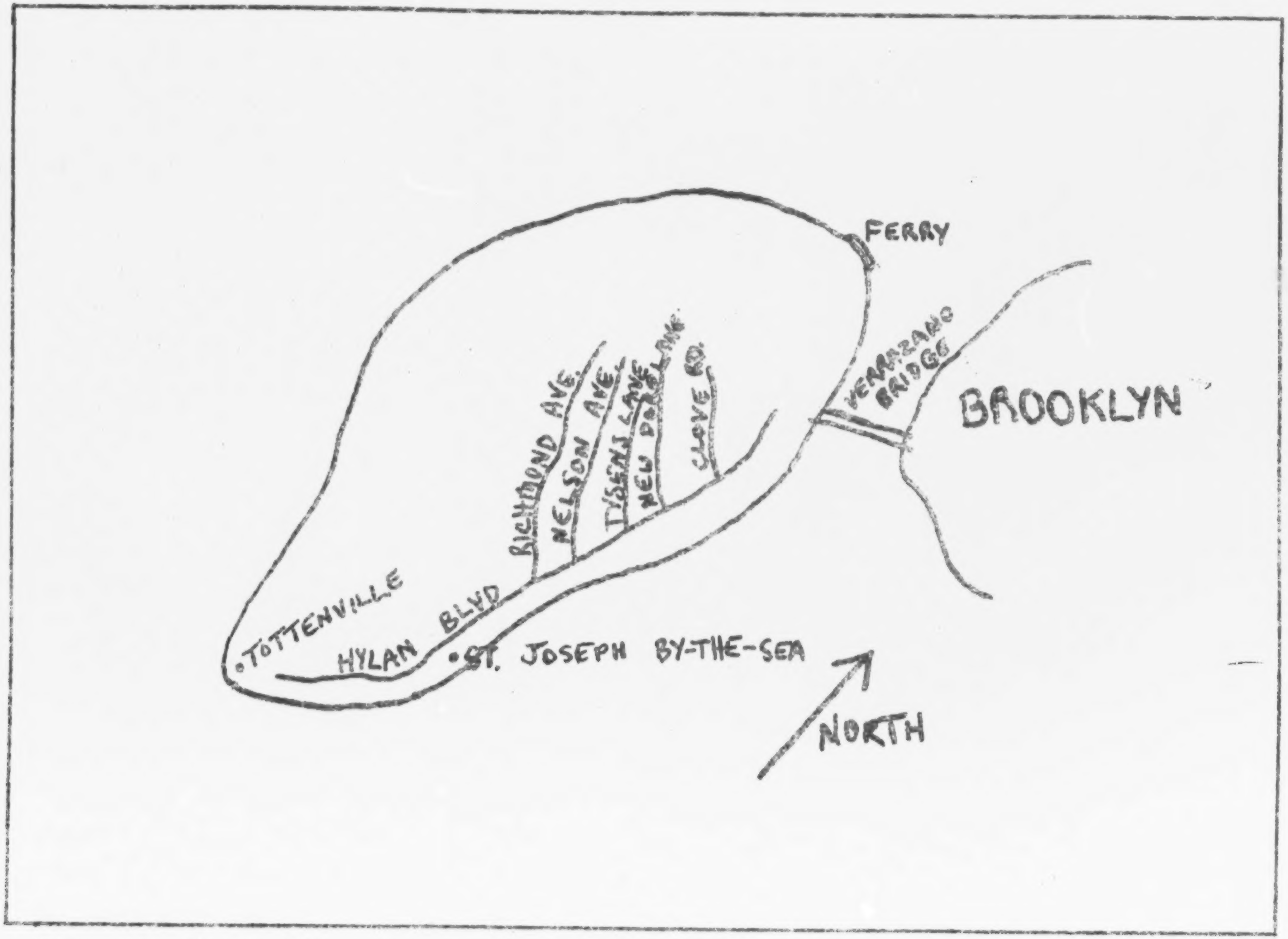

Figure 17. Mild Brooklyn orientation of a student-commuter.

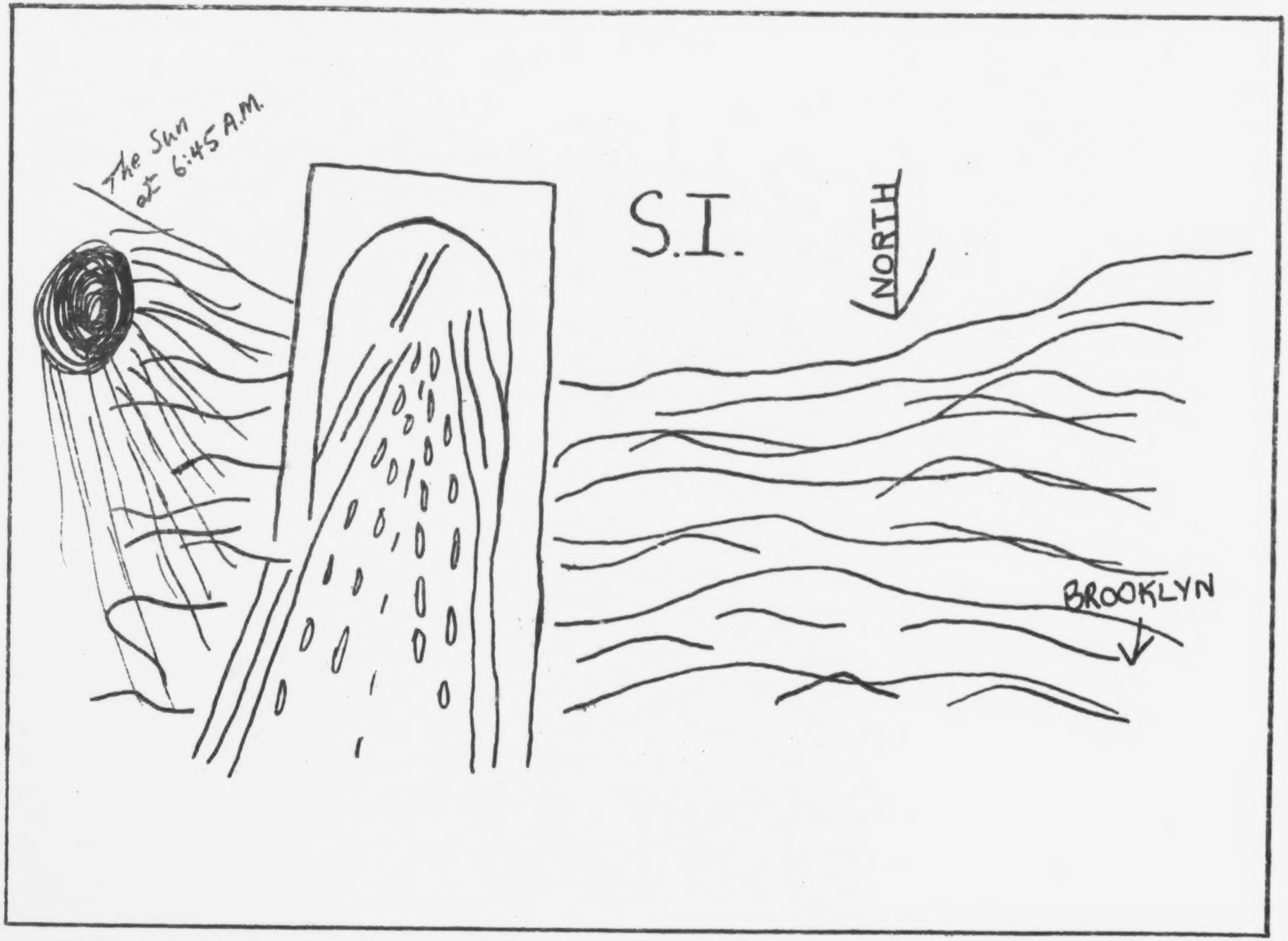

Figure 18. Ultimate Brooklyn orientation: the Island is nothing.

the spirit of the Brooklyn orientation. The Island itself is completely undefined--only the entrance to the bridge is relevant. Presumably the girl could, if pressed, supply additional information, but this tongue-in-cheek effort has an eloquence that deserves inclusion here. Many Brooklyn and Manhattan student-commuters are clear in their lack of appreciation for the Island, as suggested much earlier in the report.

Figure 19 represents a modification of the Brooklyn orientation, and is typical of the maps produced by Richmond College students. They come by ferry and the college is virtually at the terminal, so they have no need to become familiar with the Island as a whole. In the present case the young woman has simply drawn a neighborhood map, showing what is relevant--the school, the library, the delicatessen, the movie house around the corner, and so forth. So far as orientation is concerned, the Manhattan commuters tend to rotate the Island slightly more than the Brooklyn commuters who depend on the bridge.

Figure 20 is a sort of "Classic Brooklyn" map by a native of the Island (New Dorp), who has lived all of her 15 years in the same neighborhood. The shape is excellent, her understanding of the cardinal points seems to be accurate, but the map is rotated roughly 90 degrees off the standard. As might be expected of a New Dorp resident who attends school in the Huguenot area, she seems to have a clear conception of what is generally referred to as the South Shore. She captures the northward direction of Richmond Avenue, which is a pitfall for so many and contributes to the collapsing of the western sector for them. Here the west is intact, even though only Travis is marked. On the other hand, her grasp of the North Shore is a bit dubious. In brief, she shows about as clear an understanding of the layout of the Island as most residents her age--better than many--but differs from them in having a Brooklyn orientation. It is not clear why she differs in this respect, but there is a possibility that she was guided by the space available. Most of the girls in her group drew maps on one side of their paper and supplied information in space provided (half a page) on the back. This girl drew her map in the half-page remaining on the information side, and used all of the available space. Given her knowledge of the shape of the Island, by rotating her map, she was able to make maximum use of the space. Others who exercised the same option, however, showed different orientations by simply making their maps smaller.

The standard and North Shore orientations are important for the way they illustrate the fusion (and confusion) of informal and formal learning. In particular, the North Shore maps show most clearly how experiential knowledge can be distorted to fit a "correct" frame. That is, informants have somehow internalized the cartographic (commercial) outline of the Island and have forced their own conception of how communities and landmarks are arranged into that outline, even though the result is a little ludicrous. The reason such distortions are able to appear is most likely attributable to the fact that the outline of the Island is not relevant, and does not enter into programs for travel on the Island, while the arrangement of communities is important and thus tends to be preserved in a useful way.

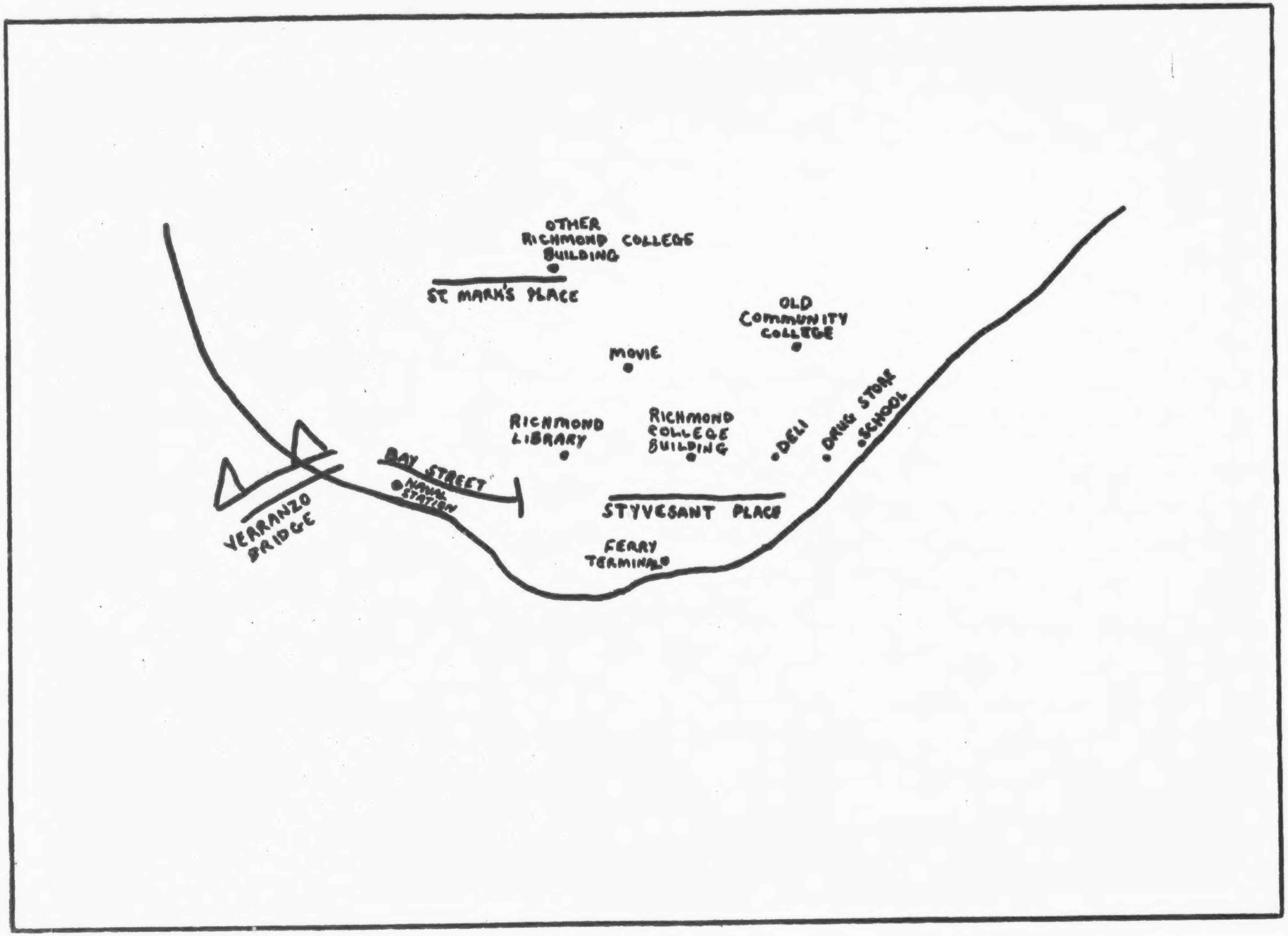

Figure 19. Map of Manhattan commuter to Richmond College.

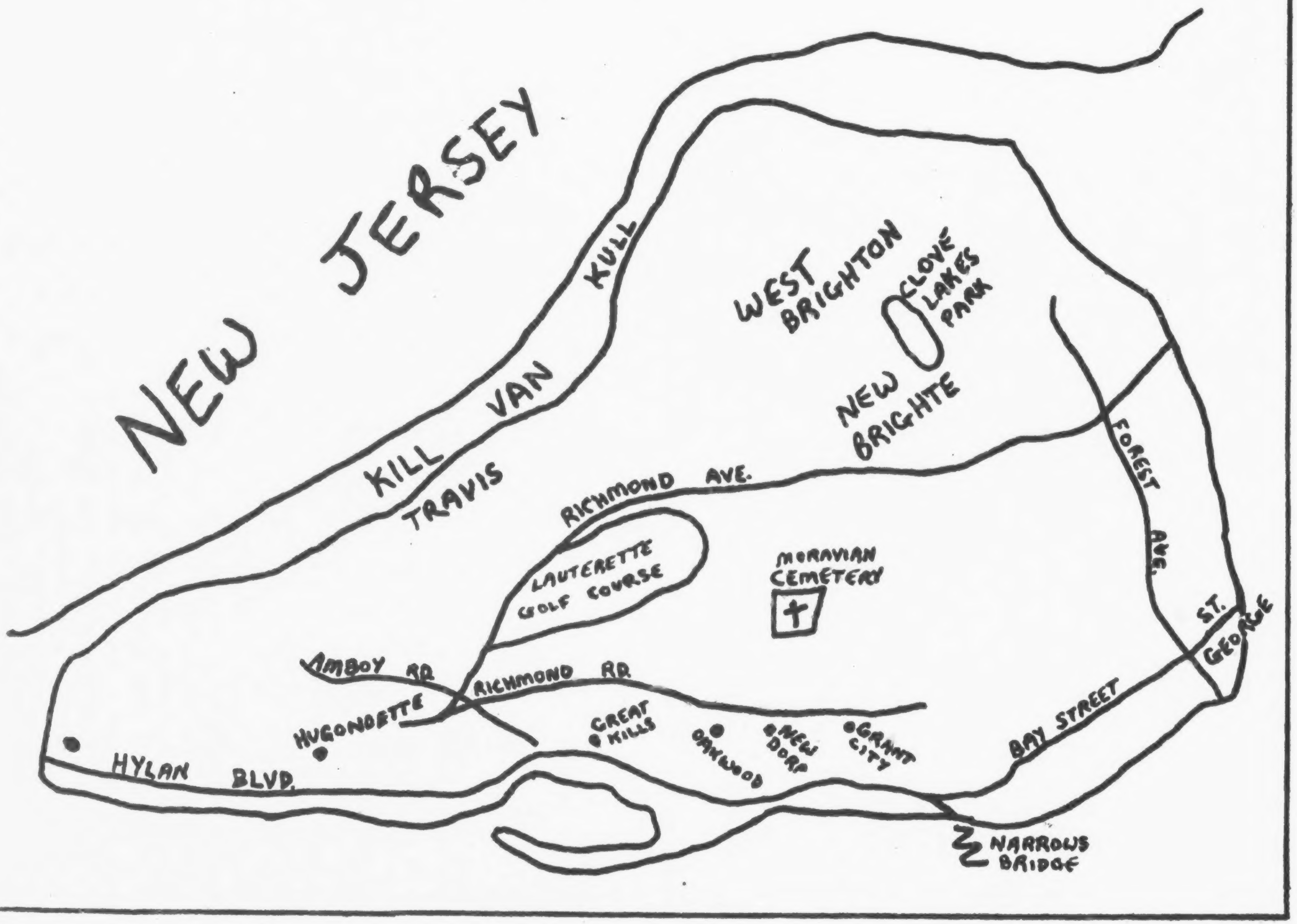

Figure 20. Classic Brooklyn orientation shown by native Islander.

The Brooklyn orientation is most instructive for revealing how the informal maps develop. In nearly every case it is apparent that the map develops directly from travel sequences. That is, commuters from Brooklyn begin with the Verrazzano Narrows Bridge and trace the relevant path (crossing important landmarks, such as principal side roads) to their customary destination. There is no reason, of course, that a commuter could not begin with his Staten Island destination and work his way toward Brooklyn, but the fact that he does not implies that Brooklyn is basic, home territory, and that the trip to Staten Island is an excursion. The Manhattan maps are even more practical instruments. Most of these were obtained from Richmond College students and they rarely show much beyond the ferry terminal, perhaps the Verrazzano Narrows Bridge, and points of interest in the immediate college area. The difference in the character of the Brooklyn and Manhattan maps is probably attributable to two factors. First, the Manhattan maps were collected during the first year that Richmond College was in existence, so that commuter-students were all unfamiliar with the Island (New Yorkers virtually never visit the Island). The Brooklyn maps are produced by high school students who may have been commuting for several years, and by current residents who formerly lived in Brooklyn. Richmond College is right at St. George, so there is no need to see more of the Island; students at the Notre Dame Academy or at St. Joseph By The Sea have to travel further once they enter the Island, and necessarily are at least exposed to more of it. Thus their maps tend to be more detailed than those of the Richmond commuters. There is no evidence that any commuters have the sort of academic interest in the Island that produces the marvels of detail found in the maps of some residents who take great pride in the history of the Island. For the proud Islanders nearly everything about the Island is relevant; for the rest, much is irrelevant, and what is not relevant is either ignored or it is distorted.

Other orientations include neighborhood maps (51) which either make no effort to produce an Island context or those in which an Island boundary was simply a formal requirement. These differ from those like Figure 10, where the greatest detail, where the greatest accuracy was displayed for a single neighborhood, and where there were a number of indicators of an Island concept. That is, several exits are marked (however inaccurately) and several places outside the neighborhood are indicated. The neighborhood orientation maps are most frequently produced by younger children, and are discussed in some detail below under Developmental aspects.

The remaining 106 maps which were elicited by our formal instructions show a wide variety of shapes and internal arrangements, but do not resolve themselves clearly into categories. Some of these are simply extremes of the main types, where the shape is apparently quite arbitrary but the general arrangement is familiar, or where the arrangements are somewhat irregular and the shape vaguely resembles that of the commercial maps but the rotation is counter-clockwise, and so forth. A few seem completely arbitrary for shape, orientation, and arrangement of communities. Of those varieties that seem to be represented several times, two are noteworthy. First is a very simple map that seems almost to be a replica of

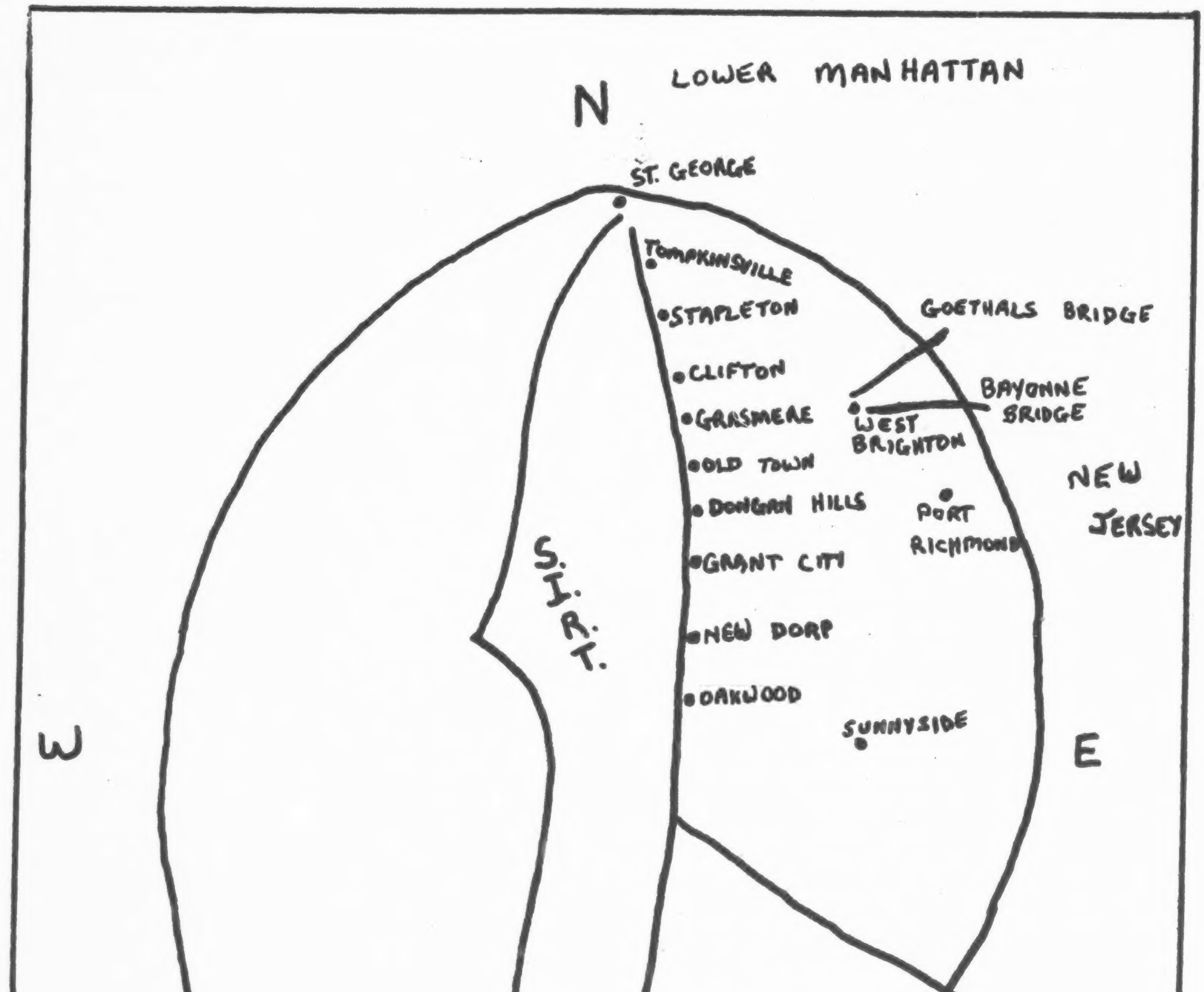

Figure 21. Map of native who cannot identify with the Island.

the train ticket, which is a narrow strip of paper with the stops printed on it in a column; those stops which are beyond the holder's destination are torn off, so that one is left with a strip which contains the names of all the stops from St. George (assuming that one has boarded at that terminal) to Eltingville (if that is the destination). Figure 21 is only slightly more complicated. It was produced by a very bright native in her early twenties who has lived most of her life in West Brighton, but who used to go regularly to New Dorp on the train. The shape is, to say the least, simple, and most of the communities shown are stops on the train route. She was astonished to learn that the train does not go in a straight line down the center of the Island. This particular map is the one that drew our attention to the idea that passive transportation is a straight line operation, and contrasts with the sort of concepts one is more likely to develop if actively driving himself (compare Figure 7, drawn by a woman from the same neighborhood). The girl seldom drives on the Island. When she goes to The City, it is by ferry. She does use the bus between West Brighton and the ferry terminal, however, and stated that her map of the Island originally depended upon bus stops. Presumably if asked to draw a neighborhood map or a map that drew on her knowledge of certain bus routes, she could provide something more detailed than the present effort. She knows that St. George is approximately north and that Tottenville is the other terminal of the SIRT, approximately south. And her labelling of east and west is correct with respect to the way she has indicated the train route. The Verrazzano Narrows Bridge is at least on the appropriate side of the Island, but she was mildly surprised and supremely indifferent to the fact that the Goethals and Bayonne Bridges were on the opposite side of the St. George terminal. Again, those bridges lead to New Jersey, as indicated, but it was a matter of absolutely no moment that New Jersey is to the north and west of Staten Island, rather than to the east. As indicated earlier, she is bright; she also knows how to be a diligent student: she is always at or near the top of her class (at Richmond and before). Her example indicates 1) a serious lack of identification with the Island (as verified by personal interview) and 2) a near total disregard of what is not "relevant."

The other near-category of maps is illustrated by Figure 22, in which one's own neighborhood is placed at the center of the Island. The most extreme example of this sort was a map produced by a Castleton Corners woman whose map was blank inside except for the name of the neighborhood; other places on the Island (representing most areas) were written in around the edge in some reasonable fashion, considering that the shape of the Island was depicted as perfectly square. Figure 22 was produced by an eighth grade girl from Tottenville. At the conclusion of her interview she remarked, "Now I think Tottenville is at the end of the Island; I thought it was sort of by the middle, though." The interview had required her to describe how she would get to various places on the Island (as indicated under Data collection, above), and had elicited characterizations of areas where she went (in addition to those asked as part of the routine). It was after describing how she knew when the train was entering Tottenville that she seemed to understand its proper placing: "The Tottenville train

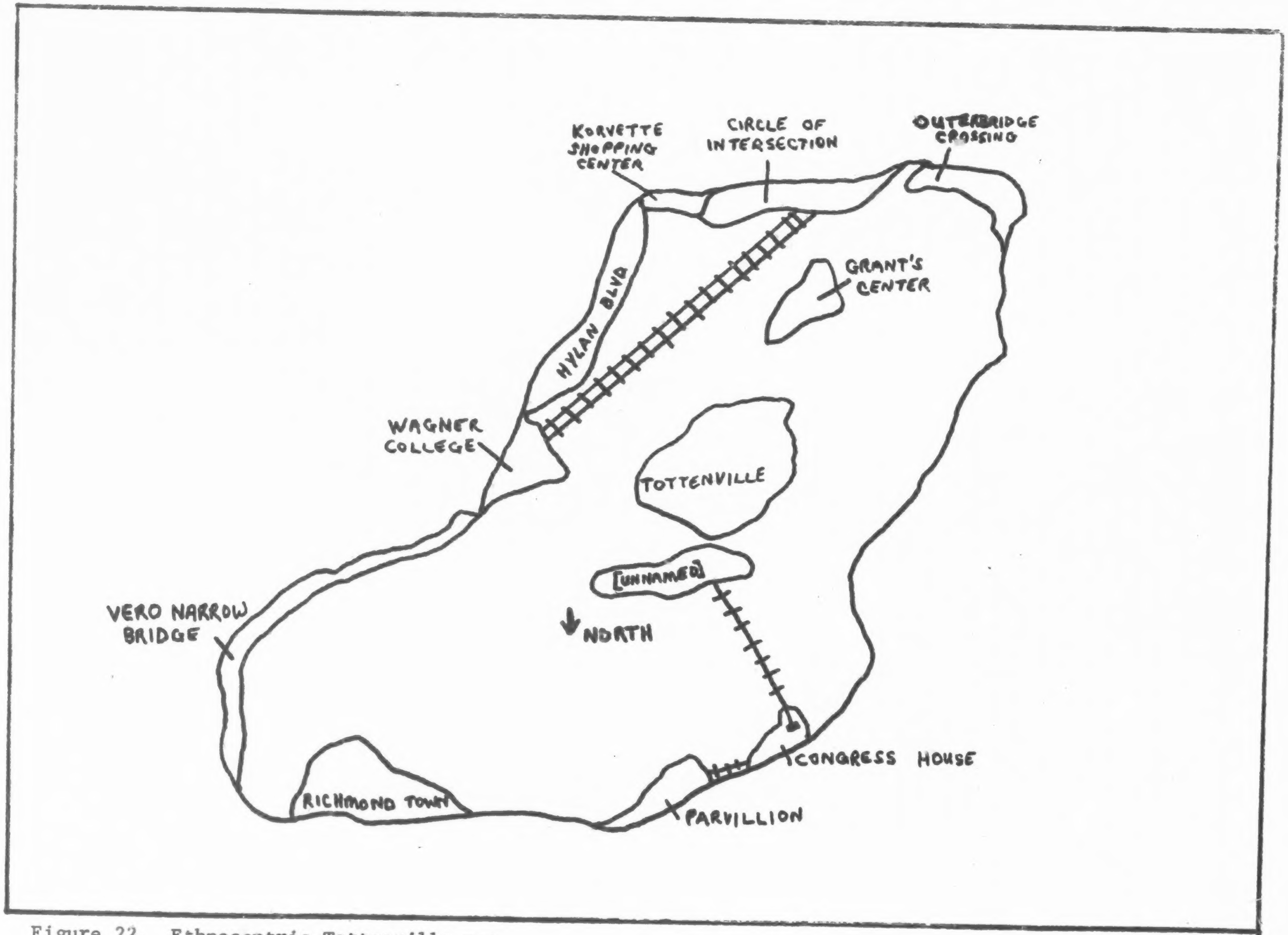

Figure 22. Ethnocentric Tottenville map.

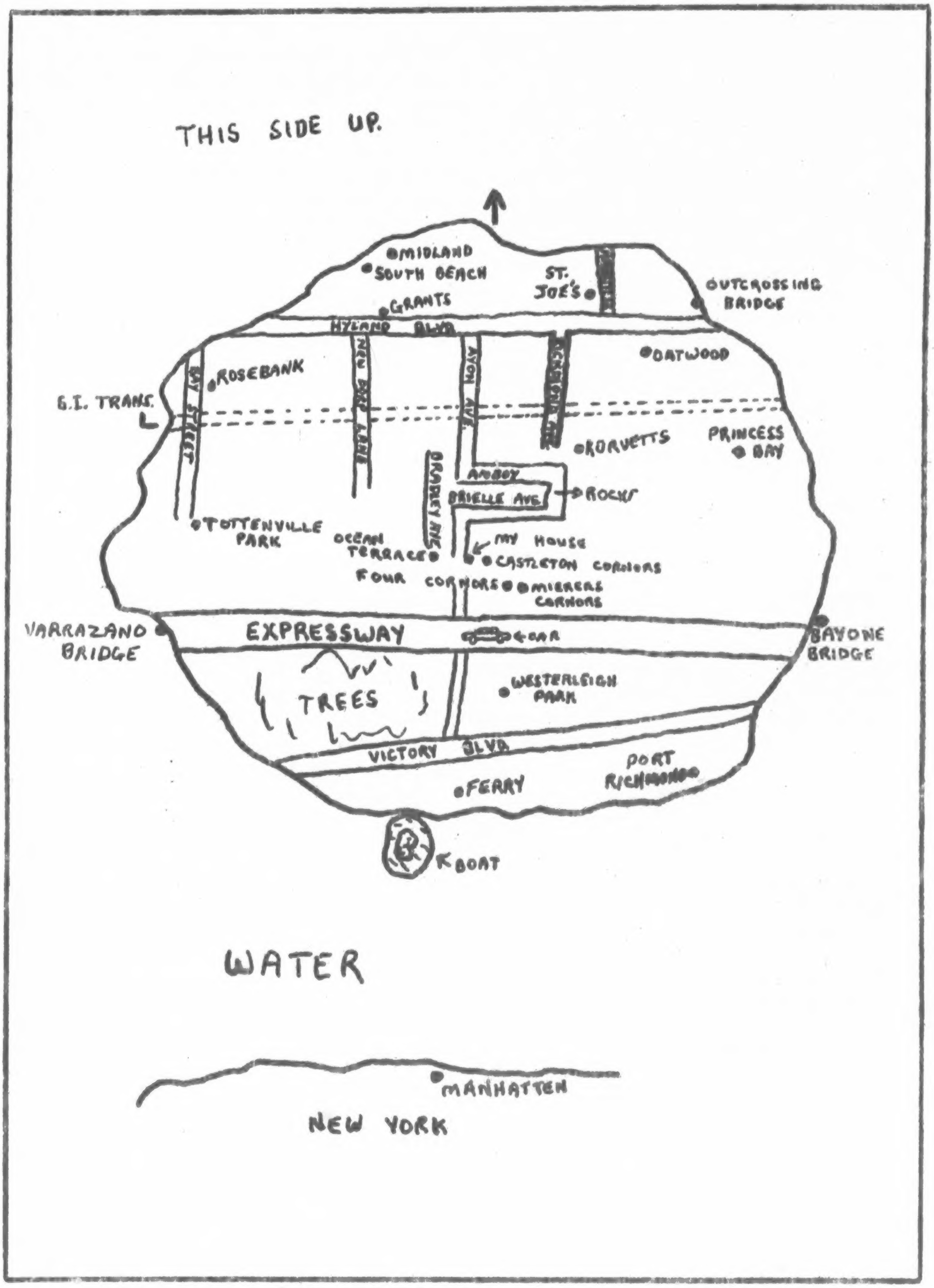

Figure 23. Ethnocentric Castleton Corners map.

station? What you see--a dead end. It goes around a bend, there are a few houses, mostly two-family, and a big ocean of water." The girl had a great deal of the information necessary to produce a less ethnocentric map, but it had never been organized into a broader perspective.

Figure 23 is a somewhat more complicated ethnocentric map, again from the Castleton Corners area. The girl is a sophomore at St. Joseph By The Sea high school. While she does not make her cardinal directions explicit, when asked what she thought of as "north," she said "the ferry," and when asked about "south," she responded, "down past school." Her neighborhood takes up a good share of the map; most of her travel is by bus. She never takes the train and does not associate it with the ferry (though they have a common terminal with the busses). She has depicted the train as progressing in a straight line, but commented later that "The train doesn't really go straight, it curves." Again, most of what she has is pertinent. She shops at the centers indicated (Port Richmond, Korvettes, and Grants), and her busses follow many of the arteries indicated (or the intersections are transfer points).

Dimensionality.

What is up or down, in or out, or along, is not governed exclusively by topographical features, though they are quite important within a given neighborhood. The accidental discovery that some people go down in opposite directions from the same point od departure and following the same artery (down to St. George from Eltingville via Hylan Boulevard and down to Tottenville from Eltingville via Hylan Boulevard) suggested that neither topography nor the conventional north-up and south-down associations were critical for determining the vertical dimension of cognitive maps. In order to make some sort of sense of these apparent contradictions in the use of elevation terms, we asked questions that were designed to show us which parts of the Island were down and which were up. Figure 8 is a composite map based on the responses of informants in different residential areas. As the figure shows, the whole coast is down, but this is something more than a simple reflection of the fact that a good deal of the inland area is actually elevated. (The numbers on the map indicate approximate elevation in feet.) Obviously one goes down from the high points toward the shore, but on some of the principal arteries (Hylan Boulevard, Amboy Road, Victory Boulevard, and Forest Avenue), one goes down in either direction and very rarely up; on the same arteries one is even more likely to go along (Figure 24); and on some (Arthur Kill Road, Bay Street, Richmond Road, and Richmond Terrace), one is far more likely to go along than either up or down. (See Table Two). Richmond Avenue is the only important artery that one is more likely to go up than down or along. Most of the up references for main arteries are given in a local context. That is, when one is speaking of the immediate neighborhood (proximate orientation), one is governed by physical features. Thus if one goes down locally, it is usually because one is going downhill to some extent. Up is almost invariably mentioned in a local context, and

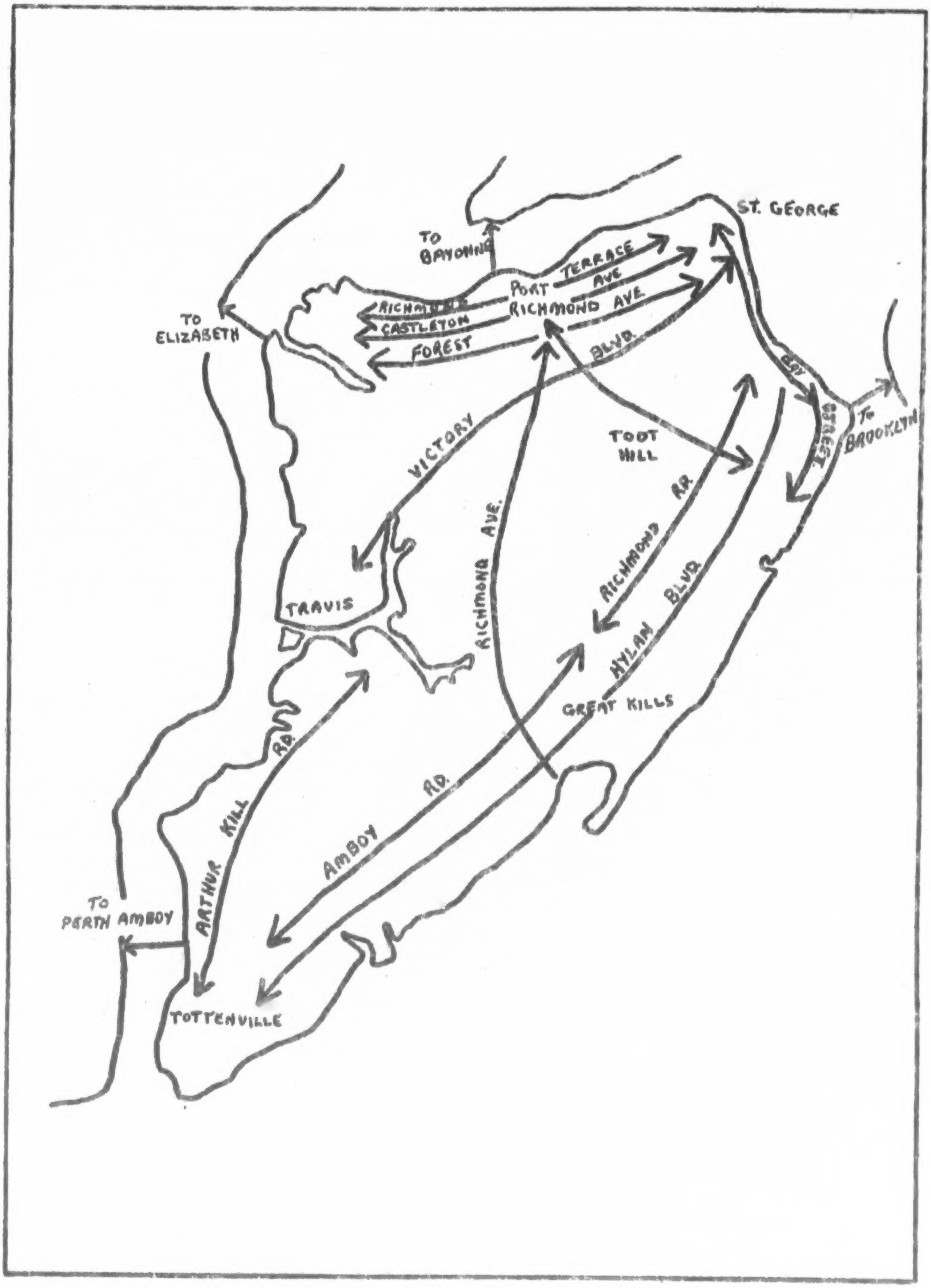

Figure 24. Arteries that one goes "along."

TABLE TWO
Verticality of Main Arteries on the Island
Based on 138 Interviews

Artery	Along	Down	Up
Amboy Road	24	10	3
Arthur Kill Road	11	3	1
Bay Street	12	4	3
Castleton Avenue	6	3	0
Forest Avenue	26	11	7
Hylan Boulevard	36	22	6
Richmond Avenue	13	15	19
Richmond Road	12	2	0
Richmond Terrace	8	4	1
Victory Boulevard	11	16	5
Totals	159	90	45
All other streets:	55	289	203

along is almost never used locally. To put the matter somewhat differently, *up* nearly always appears with reference to relatively smaller side streets, and side streets are *up* or *down* depending on the direction of the slope. Something of the difference between local (proximate) orientation and Island-wide (ultimate) orientation can be seen from the totals shown in Table Two, where there are twice as many *downs* as *ups* and more than three times as many *alongs* as *ups*. For all of the other streets mentioned, there are only about a quarter as many *alongs* as *ups* and only half again as many *downs* as *ups*. For the main arteries the ratio along:down:up is 3:2:1; for the smaller streets the ratio is 1:6:4. In a general way these ratios reflect the different ways of thinking about ultimate and proximate destinations.

Curiously, perhaps, the Clove Lakes Expressway, the cross-Island artery that joins the Verrazzano Narrows Bridge and the Goethals Bridge, is seldom mentioned. This may be because of the nature of our questions. We did not ask informants how to get off of the Island, for example, which is perhaps its main use. Even here, though, where a fair number of our informants commute from Brooklyn (and back!), their local destinations require other arteries. The girls at St. Joseph By The Sea, for instance, leave the expressway as soon as they enter it, just after passing the toll booths, and head south on Hylan, roughly at a right angle to it. Many of our informants depend on busses or the train, which again rules out the expressway. On those infrequent occasions when the expressway *is* mentioned, however, one usually goes *over* on it. The expressway is itself largely elevated, and goes across the Island in the area of greatest elevation.

The use of *over* is fairly common whenever the topography is suitable. Most notably, perhaps, one may go over to the North Shore from the South Shore and vice versa. That is, from Port Ivory or Mariners Harbor to St. George (or New Brighton, since St. George is, technically, East Shore) the trip to the South Shore (from below the Verrazzano Narrows Bridge to about Tottenville) involves passing over relatively high elevation, and *over* seems appropriate. But there are alternatives. From the South Shore one may go *down* to the North Shore (or *into* Port Richmond, for shopping),

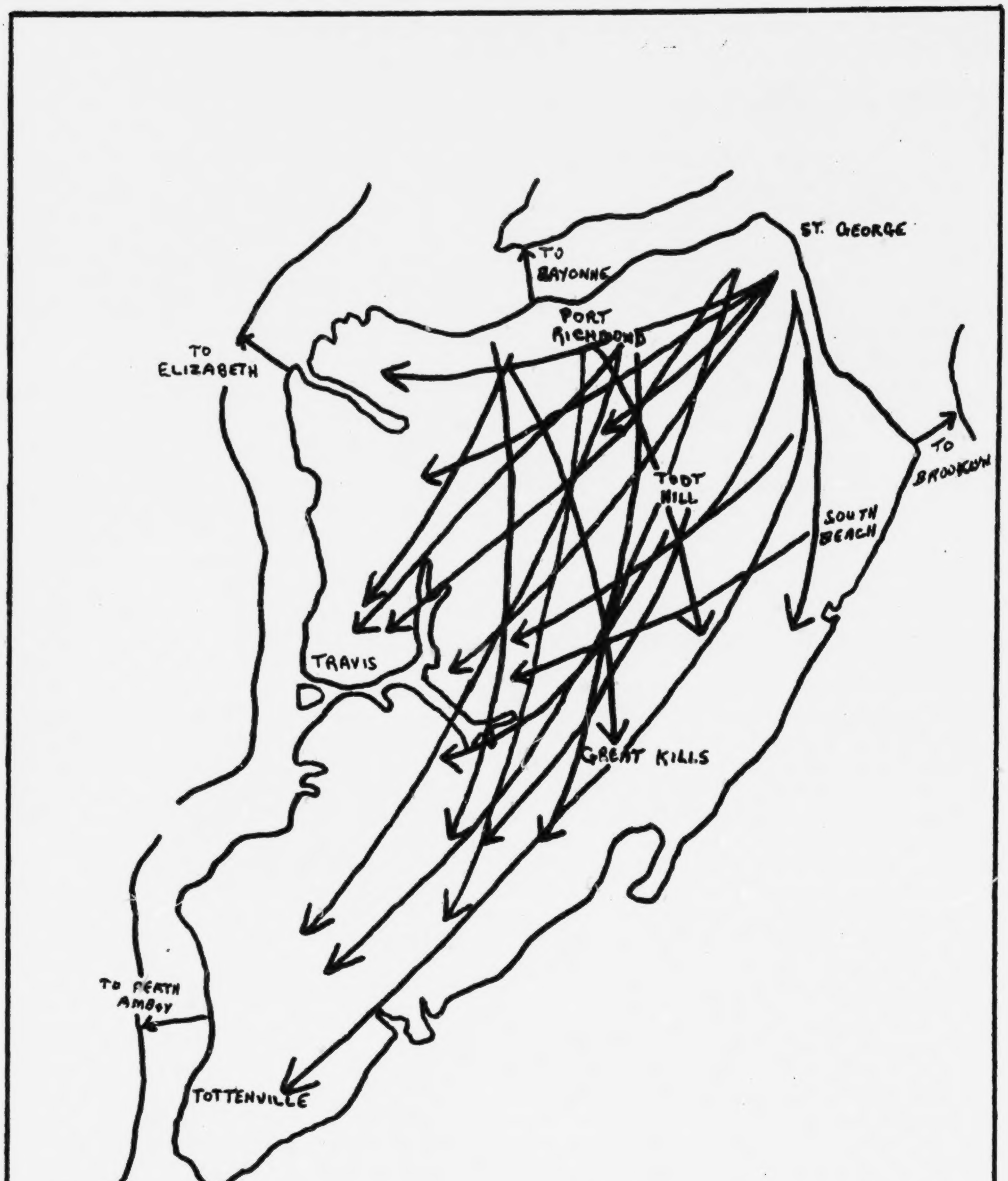

Figure 25. Areas toward which one goes "out" on the Island.

while North Shore people are likely to go out to the South Shore (Figure 25).

In general, one goes along the arteries that lead down, and it is possible to go down in opposite directions on the same artery. The feeling we get from the interviews is that this is possible because such arteries lead to the "end" in either direction. One goes down toward the end. One goes down Hylan Boulevard, for example, toward that end of the Island which is (approximately) St. George, and one goes down Hylan toward that end which is Tottenville. Again, one can go down Victory Boulevard toward the end (approximately) at St. George or one can go down toward the end at Travis. One Tottenville youngster said that the whole Island is a hill with St. George at the bottom at one end and Tottenville at the bottom at the other end.

Even if one goes down toward the end, the ends are not equivalent. As Figure 25 shows, a composite "out" map indicates that the most reliable point of departure for going out is St. George. That is, St. George is the ferry terminal, the train terminal, and the bus terminal. From that terminal one goes out in all directions. More generally, one goes out from the heavily populated North and East Shores toward the more sparsely populated west or south. One approaches the boondocks to the extent that he approaches Tottenville.

In brief, orientation within the neighborhood depends largely on topographical features. Ultimate orientation depends on less obvious considerations: traditions which stem from the difference between heavily populated areas (and their importance for shopping) and sparsely populated areas ("the sticks," with limited facilities); very general topographical features, such as the relative elevation of Todt Hill, Grymes Hill, Emerson Hill, Ward Hill, and the like, in the same sector of the Island and to some extent separating the North and East Shores from the rest of the Island; and, finally, and perhaps most important, the communication network in which all public transportation facilities converge at St. George (the main exit to The City, into which one goes).

Developmental aspects.

By the time individuals reach high school (9th grade), they have generally reached the point at which they produce "adult" maps. That is, they are relatively abstract and tend to deal with the Island as a whole in a somewhat broader context. Even by these very rough criteria, though, there are very "primitive" maps among those produced by adults, especially from those who are not particularly familiar with the Island, while some of the youngest informants are relatively sophisticated in their treatment.

The youngest group from which we elicited maps were fourth-graders, most of them 10 years of age. These show considerable variation, but there are certain instructive features that tend to distinguish them from the adult maps. First, the more elementary maps may or may not show an Island boundary, but if they do it is usually not very obviously related to anything except the margin of the paper. Few if any streets are named,

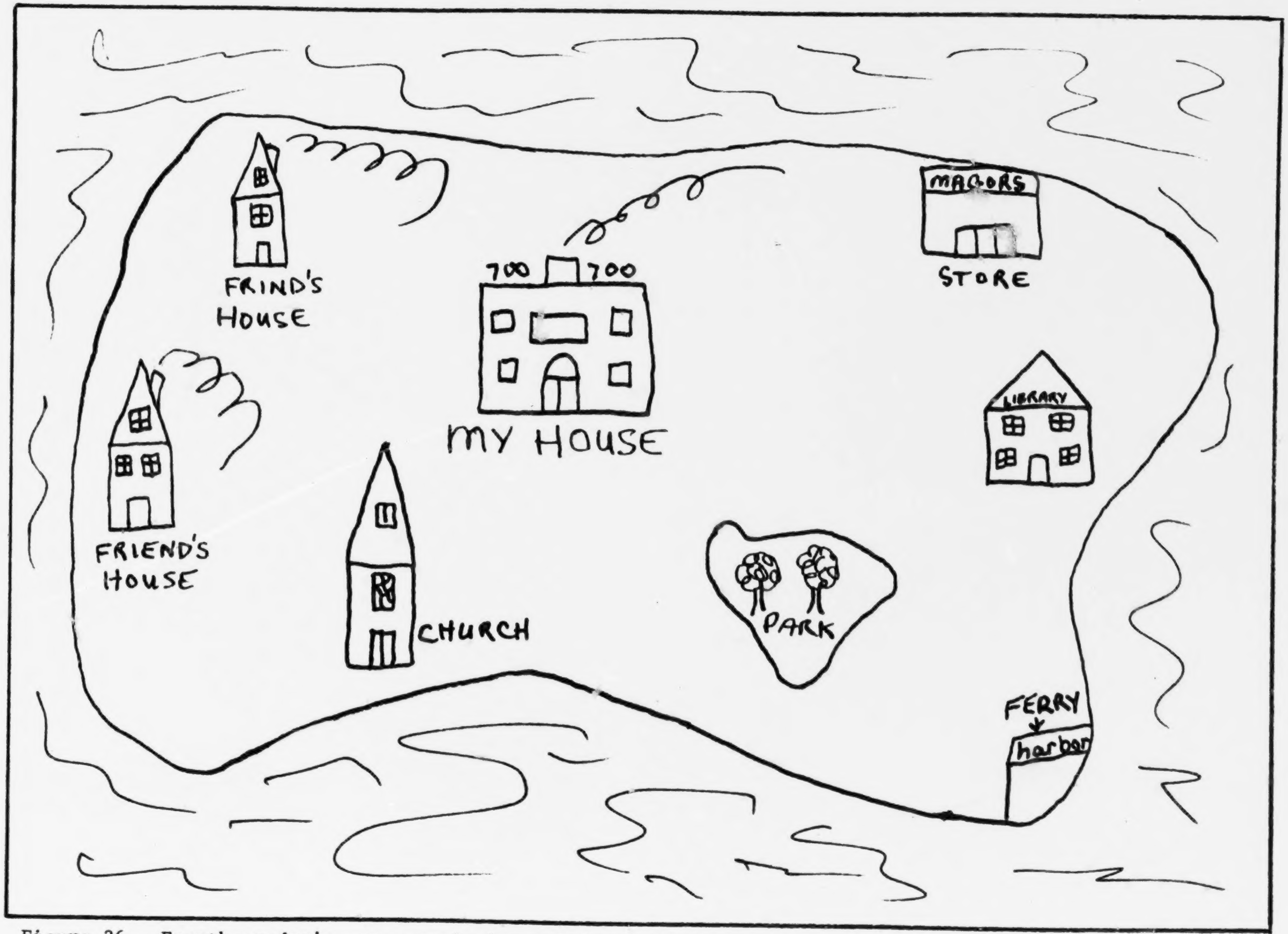

Figure 26. Fourth-grader's map, consisting mainly of drawings of important features.

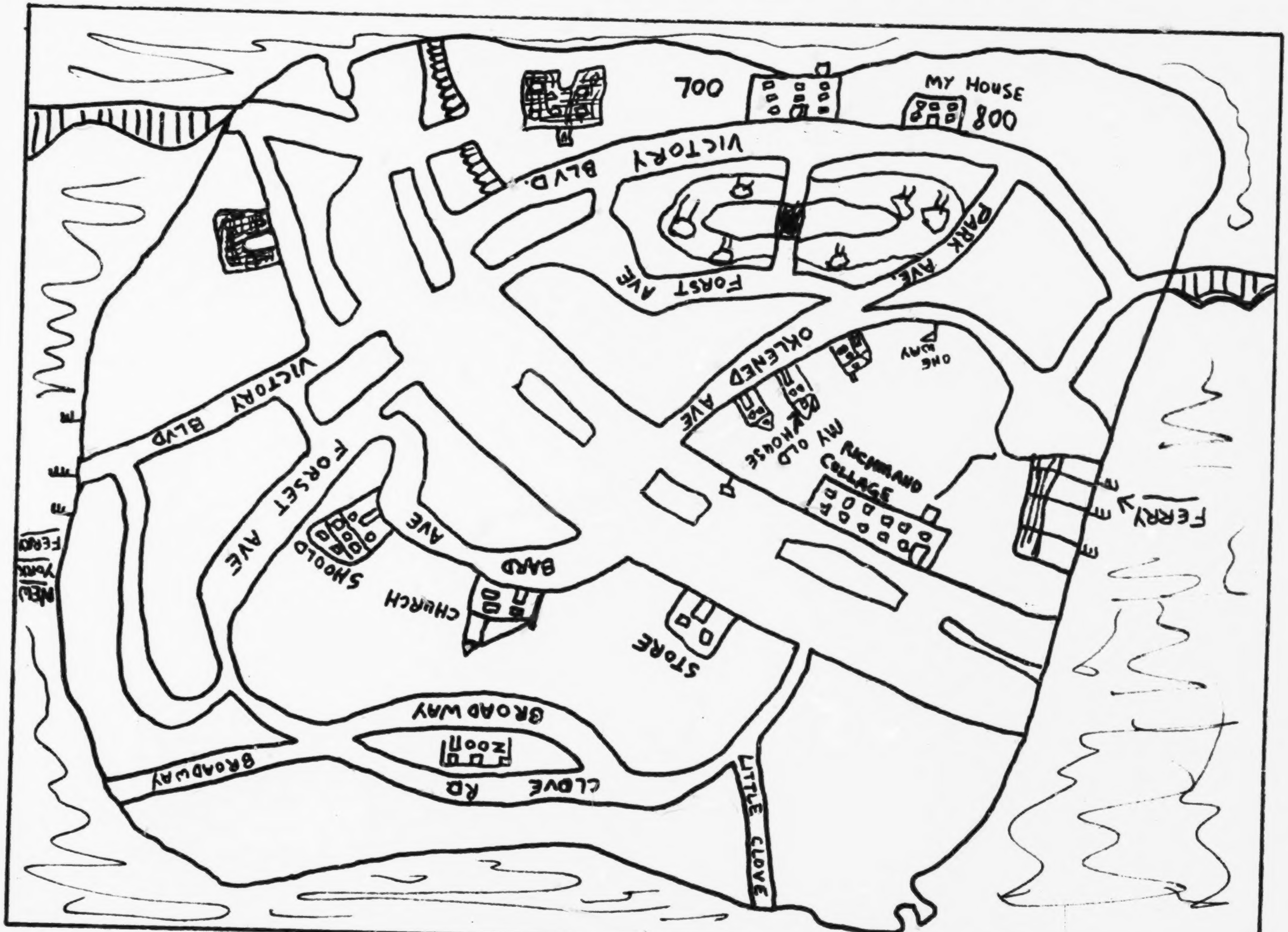

Figure 27. Fourth-grader's map showing Island and local features.

and everything is given in terms of significant landmarks: one's own house, the houses of one or two friends, one's church, the school, the local candy store, and so forth. That is, the productions are not so much maps as they are pictures of important features of the neighborhood. Nowhere is the principle of relevance more clearly illustrated than in these simplest of maps.

Figure 26 is a fairly representative fourth-grade map. Most of the available space is filled and the relationship of the landmarks to the Island as a whole is dubious. Some maps show abundant blank space, possibly implying a more advanced grasp of the Island. That is, they may imply an understanding that the Island does not equate to one's own small neighborhood. On the other hand, many of the adults did not leave space for uncertain areas--wasteland disappears and the result is a collapsed map.

About half of the 4th-grade maps from P.S. 45 (from which Figure 26 is taken) are rather simple: some more, some less than the map in Figure 26. The next example, Figure 27, shows a considerable advance in sophistication, though there is still a tendency to draw pictures of landmarks. We interpret such pictures as being more concrete than mere written labels. In the present case, streets are labeled and at least some of them make sense in conventional terms. The zoo, for example, _is_ between Clove Road and Broadway, and those streets _are_ divided as shown to the left of the zoo. But they do _not_ intersect, as shown, to the right of the zoo: they both cross Forest Avenue (separated by another street). The most obvious confusion seems to be in having the "Ferry at one end of the Island and the "New York Ferry" at the other end, especially since the actual New York ferry terminal is virtually across the street from Richmond College (shown at the far left of the map). The designation of bridges and the ferry implies that the boundary of the Island has some meaning for the youngster. There is considerable drawing of landmarks, and these again seem to reflect the more significant features of the area from his standpoint: his house, his former home, the school, the church, the store, and the zoo. The depiction of Richmond College is a little unexpected, but his teacher was taking courses there at the time.

Figure 27 is quite complicated, but actually includes only a limited part of the Island even though all of the space is filled (compare Figures 5 and 7, drawn by adults, and Figure 23, drawn by a high school girl). The map as a whole suggests that detailed local knowledge and isolated other landmarks are synthesized into a single conceptual entity which lacks accuracy so far as the Island as a whole is concerned.

Figure 28 is rather a typical neighborhood map, drawn with considerable care. While no attempt is made to place the neighborhood within the context of the whole Island, a relatively accurate and detailed neighborhood map implies some larger grasp of the Island, even though it has not been shown. That is, there is a sophistication about such maps which is lacking for those which merely show three or four buildings to take up the space of "the Island," where the boundary exists only because the youngster knows academically that islands are surrounded by water.

The most remarkable 4th-grade map is languishing in Tokyo, pending the appearance of the _Proceedings_ of the Eighth International Congress of Anthropological and

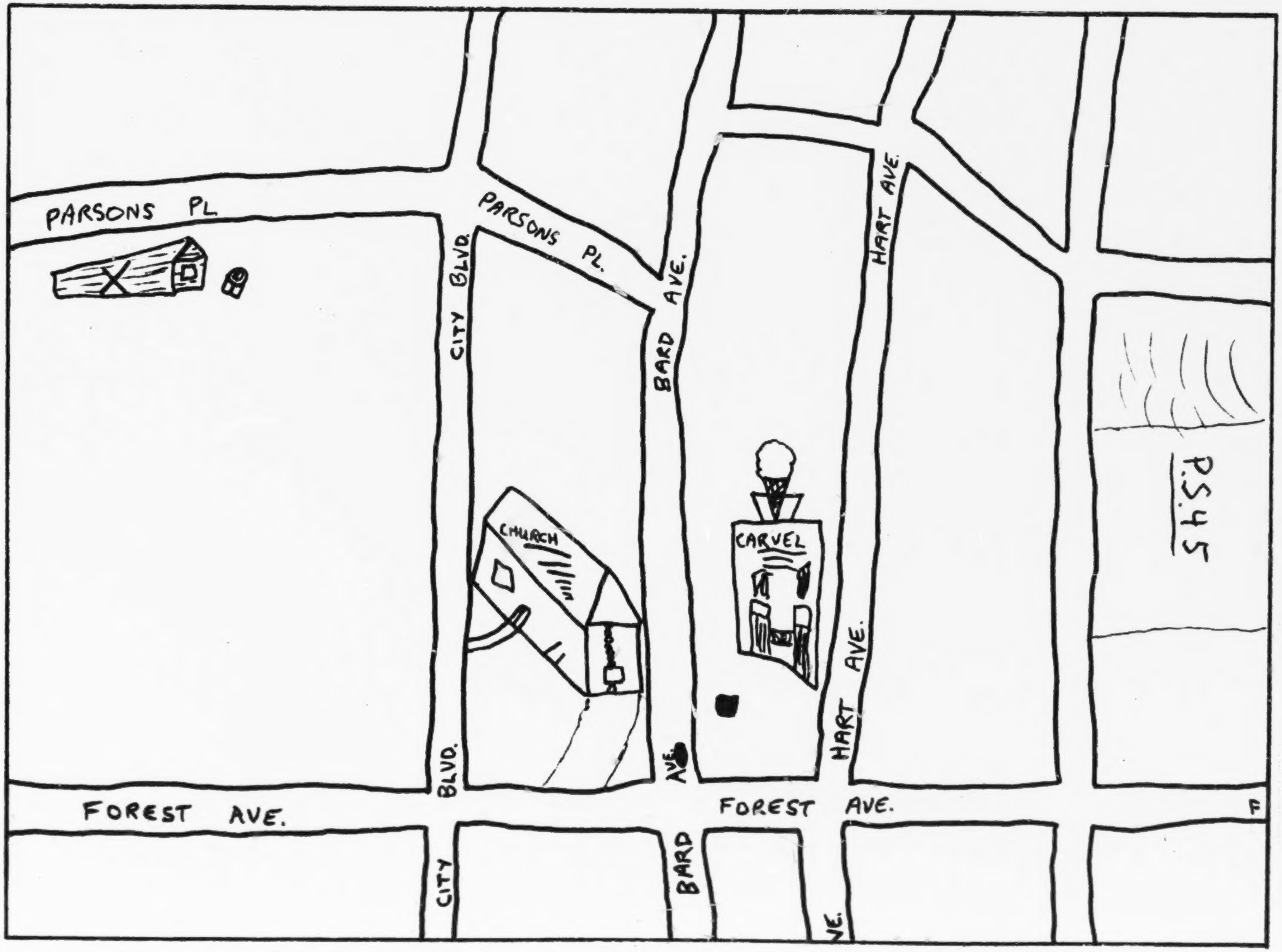

Figure 28. Fourth-grader's carefully executed neighborhood map.

Ethnological Sciences (which met during the first ten days of September, 1968). In it, Staten Island is completely undifferentiated except for the indication of the youngster's own home. But it is placed into a global context (however inaccurate). New Jersey is just below the United States; the Hudson River flows through the Atlantic Ocean past Manhattan (which is accurate enough) to South America (obviously not accurate). Manhattan is completely separate from the Bronx (misleading), while Queens is shown as an island (which it is not). The Pacific Ocean runs between Queens and Long Island Sound; there is no Brooklyn; Long Island is shown as a small, separate entity (which it is not). Finally, the two states of Georgia and Florida are shown south of Long Island (correct, though the distance shown is, to say the least, deceptive). After studying several dozen mundane maps, from adults as well as children, the boldness of this global map was startling. Lamentably enough, we have no information on the lad's background, but a slightly less astonishing map was provided by a classmate who had spent the previous three years in Minnesota, more than a thousand miles to the west.

The wordly effort just described should suffice to indicate that there is no precise correlation between a youngster's age and the sophistication of his sketch map. But there are developmental changes of a general nature. As stated earlier, drawing implies concrete rather than abstract conceptions, and meaningful boundaries imply a grasp of larger entities than those which are related only to the edge of the paper. Among the adult maps there are virtually no drawings, except for an occasional bridge, perhaps. Communities and landmarks are usually spelled out directly on the maps or numbers are used and a key is provided (Figures 19 and 21 were done this way and were converted into labels by us for ease of presentation). While a few adult maps are impoverished by comparison with the more complex 4th-grade maps, in general a reasonable number of areas are indicated. For the first 33 adult maps collected, for example, the fewest number of places indicated was six, with a median of 21 places. Only one map had more than 46 places indicated, and that was from what the anthropologist calls "a good informant." She indicated at least 75 places, including streets, communities, and various landmarks, then gave up for lack of space to indicate more. As might be expected, the shape and orientation of her map corresponded to the commercial maps. She has lived in many areas on the Island and takes enormous pride in her knowledge of local geography and history.

Between the adult (ninth grade and higher) and fourth grade extremes, we might expect to find transitional stages. Thus we gathered 128 maps from 6th, 7th, and 8th grade students from Tottenville. The sample was biased in two ways beyond its having been selected from a single school. First, there is considerable instruction on New York state geography in general, and at least some instruction on Staten Island in particular. Second, as the principal of the school remarked, "People in Tottenville are very Island conscious." Both factors probably play a part in the fact that the maps as a group are fairly accurate and the shapes tend to correspond more frequently to those of the commercial maps than do those of the rest of the study as a whole. There is not much to separate the three grades, so far as the quality of the maps is concerned, though the

8th graders show some advantage over the 6th graders in shape and the number of places indicated. For the whole sample there are 86 maps (two-thirds) which show a standard orientation, four maps (about three per cent) which show a Brooklyn orientation, and 14 maps (not quite 11 per cent) which show a North Shore orientation. Not quite 19 per cent (24 maps) defy classification into one of the major orientations. A common feature that does not appear in the maps from any other single area is the mention of of the train, even though many of them never use it. That is, in most cases where the train is mentioned, it serves as transportation for the individuals concerned. In the present case this seems less critical (so far as the high frequency of its mention is concerned) than the fact that it is a salient feature of the landscape. Perhaps the relatively great Island-consciousness also accounts for the fact that the group mentioned more bridges more often than samples from other areas. In general the maps show about the same range of variation as the adult maps (including those of high school students). There are very few really primitive maps. The 6th grade girl who drew the map in Figure 29 spends virtually all of her time in Tottenville and when she goes shopping (with her parents) it is most frequently in New Jersey. During the interview she admitted that she had no idea of where the Bayonne Bridge is located. Her placing of the different landmarks is rather arbitrary, but she certainly seems to have the concept that Staten Island is an island, if we may judge from her placing of the Atlantic on one side and the Pacific on the other!

Figure 30 is somewhat more representative of the 6th grade productions. Here, even as in the previous case, the Island boundary suggests that the Island is conceived as an entity (which is not implied by the 4th grade maps which deal only with the immediate neighborhood). There is some drawing, as the Tottenville Parish (church), but considerable labeling. All exits are indicated (the correct number of bridges, even if their placing is a bit puzzling, and the ferry in two places which never quite meet). Thus various places around the Island are indicated in addition to the rather detailed neighborhood map within it. She reveals no clear orientation in the terms we have been discussing, but in the interview she indicated that Tottenville was up here and St. George was down there. She appeared to be familiar with the bus routes to most of the important shopping areas on the Island, and when asked how Tottenville differed from St. George, she replied that "there are stores down in St. George."

Figure 31, again a 6th grade production, is clearly a North Shore orientation, though with some distortions. That is, the North Shore is omitted, but Tottenville is suitably placed (with "north" pointing south). While Midland Beach and South Beach are reversed, they are in good relation to the Verrazzano Narrows Bridge, and the zoo seems well located. The train line suffers an east-west reversal, and the Lemon Creek (draw-) bridge is given more central attention than its proper placing (in Prince's Bay) would require. Again, the whole Island is indicated, but the neighborhood is given special attention.

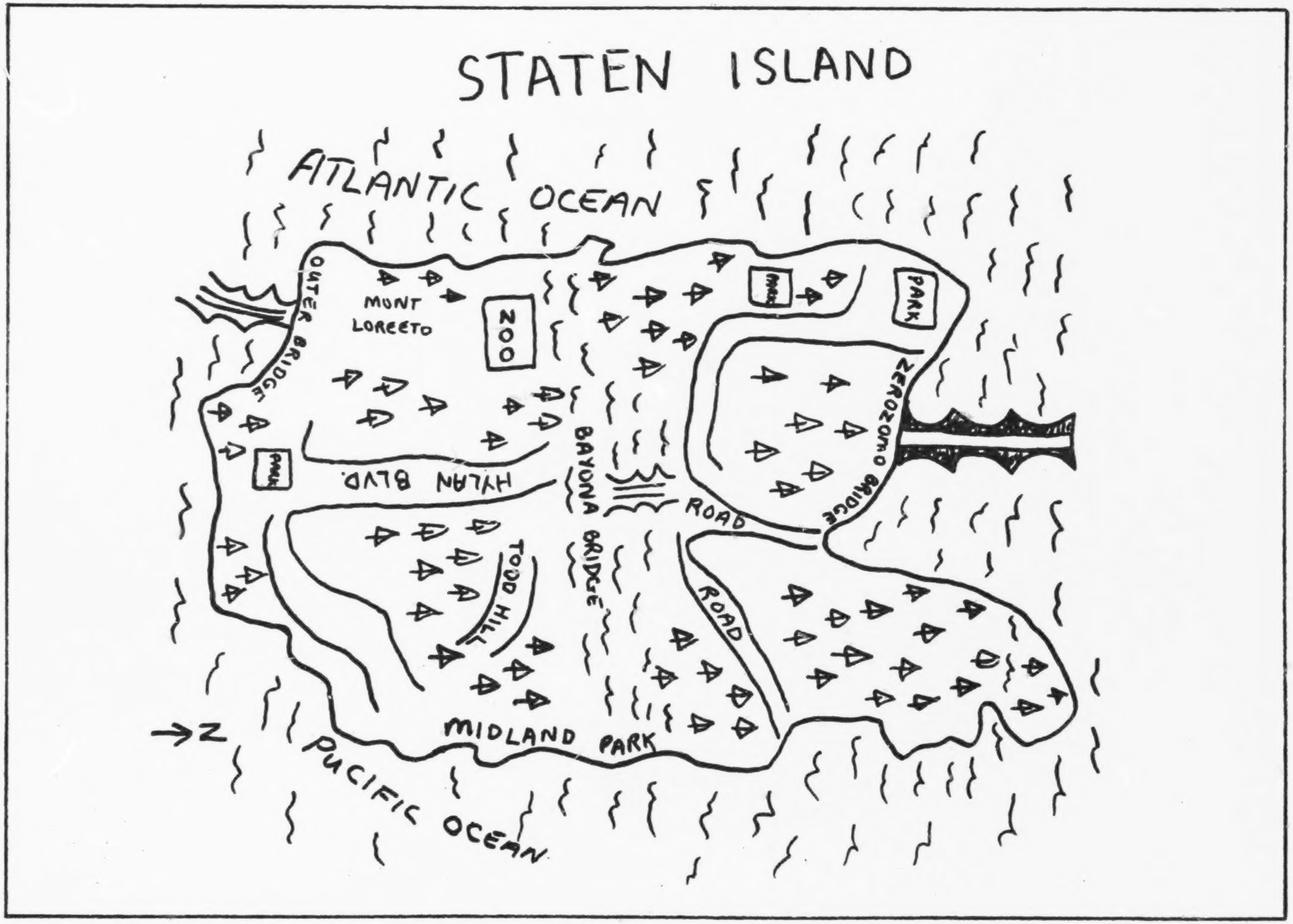

Figure 29. Map of Tottenville 6th grader whose family usually shops in New Jersey.

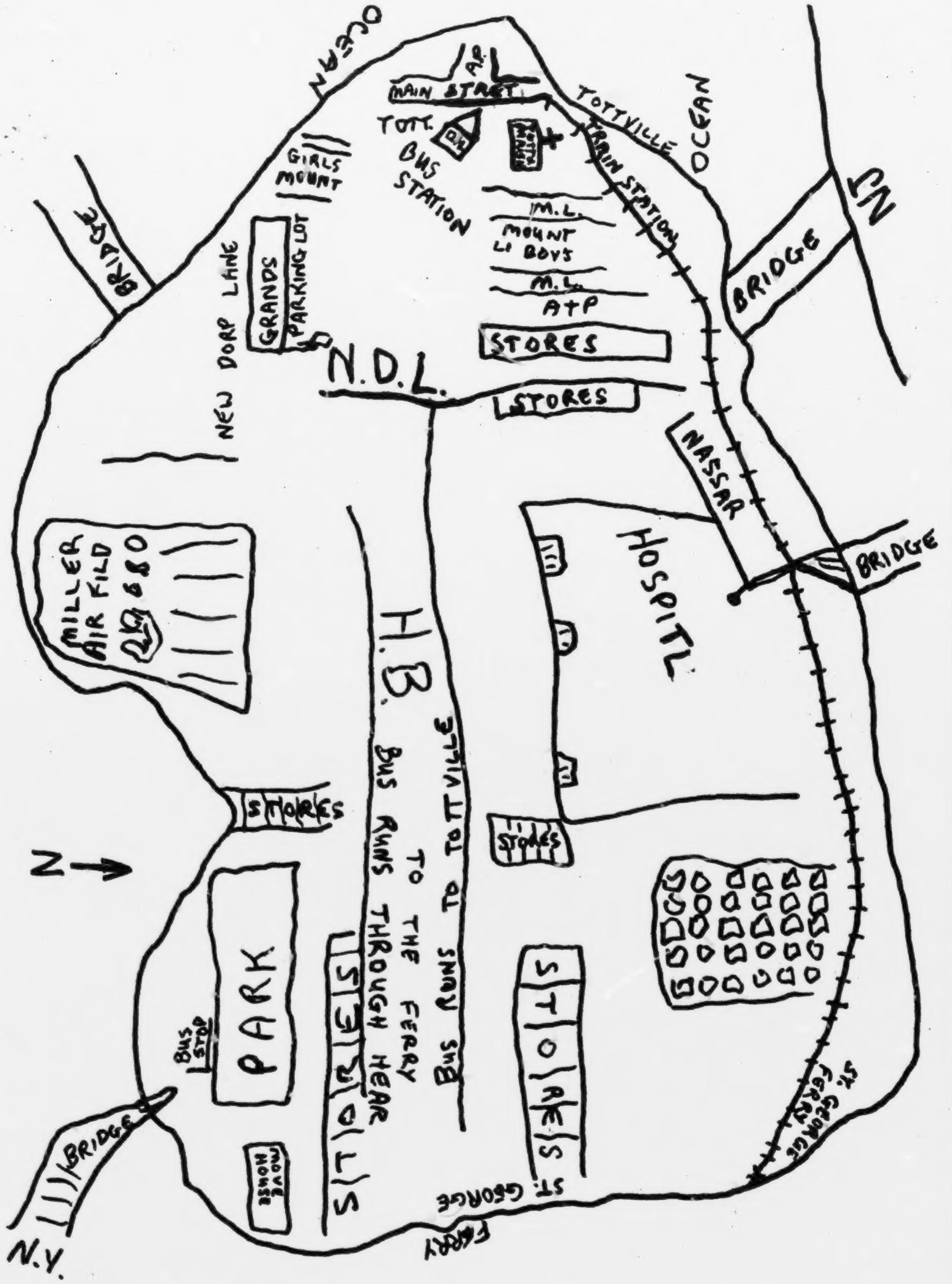

Figure 30. Representative Tottenville 6th grade map.

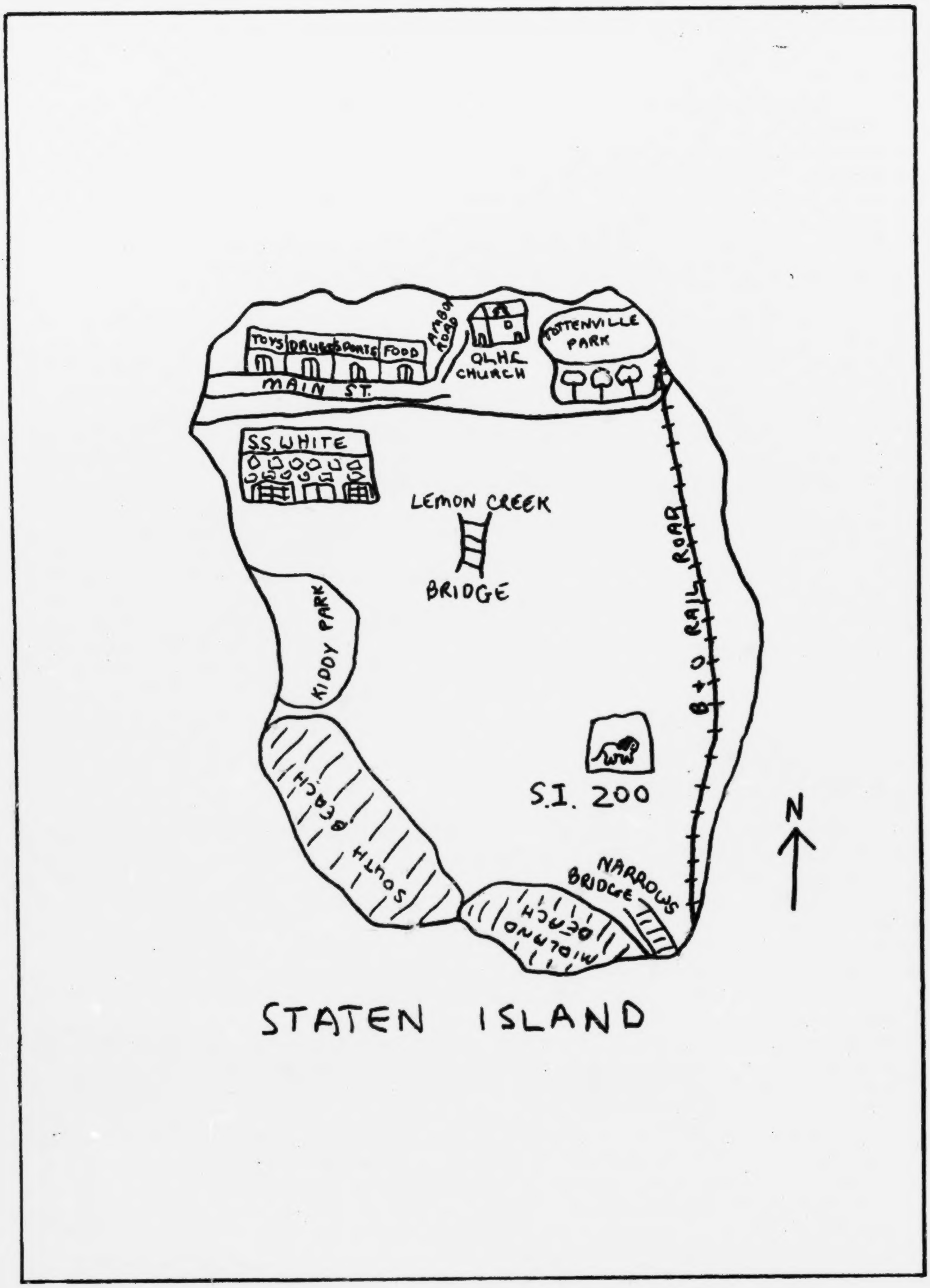

Figure 31. Tottenville 6th grader's North Shore orientation.

Finally, Figure 32 is a rather complex 7th grade production. The boundary is a bit uncertain (with Silver Lake in New York Harbor). There are reversals (notably Stapleton, Tompkinsville, and Port Richmond), or the map would appear to be a Brooklyn orientation map. So far as we can judge from the interview, the places she indicates on the map are important to her--she attends school in Tottenville, lives in Richmond Valley, used to live in Prince's Bay,where she still shops frequently; she attends church in New Dorp, and rides the train frequently.

As with all of the maps generally, what is shown is what is relevant. The Tottenville grade school maps are unusual in that they combine neighborhood details with some real conception of the Island as a whole. We have selected some of the more interesting maps for display here, but the majority fit into the general categories previously discussed for adults, differing most notably, perhaps, in their general accuracy. This, as we suggested initially, is probably a function of interest which is encouraged at school through more formal instruction.

Formal versus informal aspects.

The ultimate learning in the context of the present study is a fusion of formal and informal knowledge as displayed by the "good informant" described above. There is no point in attempting to reproduce her map here because it so closely approximates the commercial maps (with the technical difficulty of additional landmarks that no single commercial map provides). As we also mentioned, she has a passionate interest in the Island. It appears from the majority of Tottenville grade school maps, that enthusiastic instruction coupled with a proud interest provides the sort of experience that should yield a disproportionate number of "good informants" for the future.

The Brooklyn maps provided by commuters, including those from Manhattan, show limited detail. They are practical maps of what one must know in order to get to one's (single) destination. They are quite adequate maps developed of necessity and through experience. The North Shore orientations generally show a conception of the Island which is forced into an inappropriate frame--the "real" shape of the Island, except that the arrangement of communities is completely reversed and thus the "real" shape is not in the least appropriate. It probably matters little to the individuals concerned, since their movements are no doubt governed by the *relationships* of communities and transportation routes which are obscured rather than illustrated by the artificial framework into which they are fitted in the sketch maps.

Some of the maps of adult natives which focus primarily on a limited part of the Island (Figure 7, for example) are also very pragmatic and undistorted by empty learning. Similarly, Figure 5 bears virtually no correspondence to a commercial map of the Island, and shows only communities along the North Shore. It hardly matters that New Brighton is "really" to the right of West Brighton in the perspective of her map, since the relevant

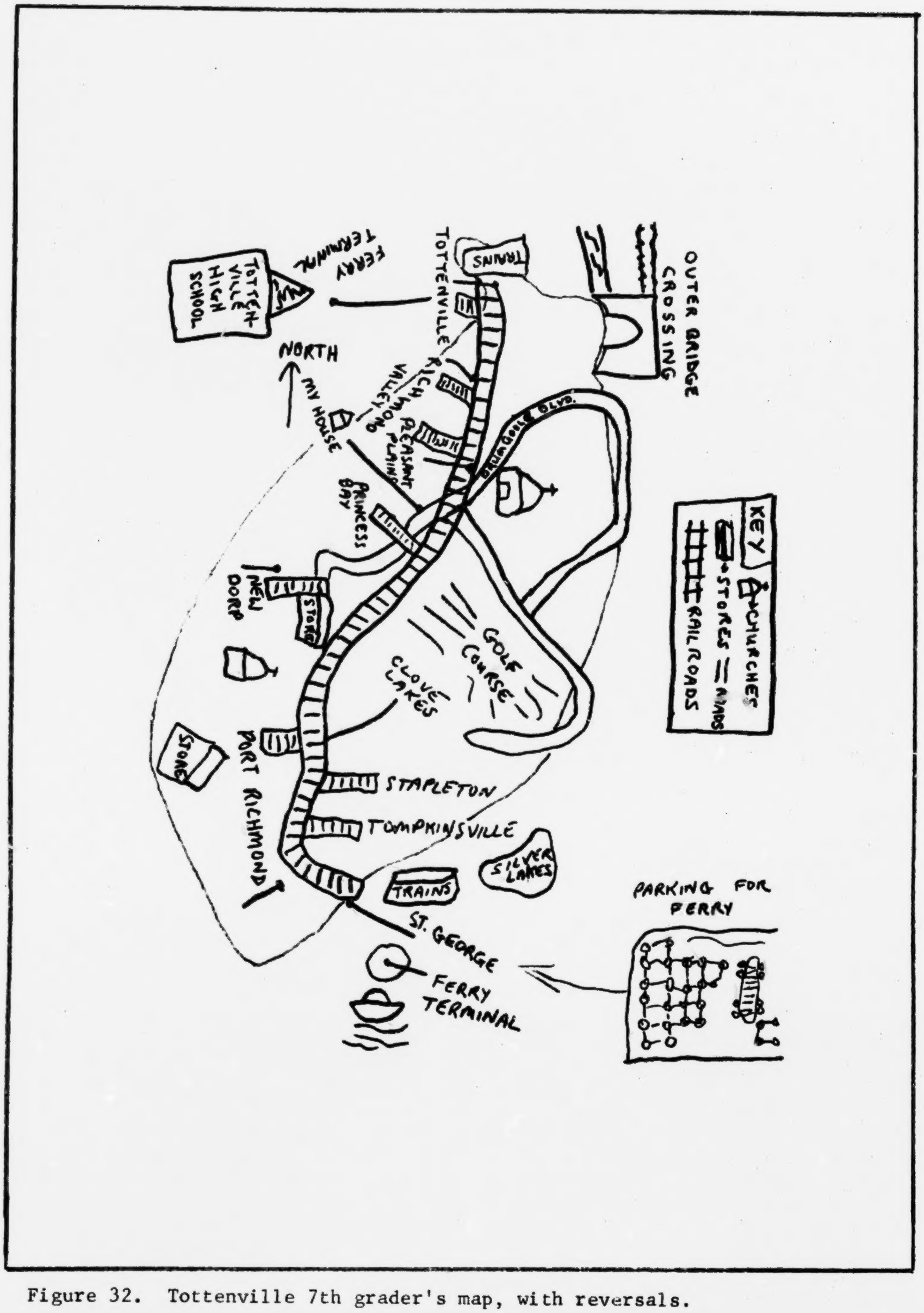

Figure 32. Tottenville 7th grader's map, with reversals.

information is that which relates the community to the bus line. Thus a map may not be technically accurate by commercial criteria, but it may make more sense than one which is distorted by such facts as the real shape of the Island for someone with a North Shore orientation.

As indicated by the maps in Figures 3 and 4, where a neighborhood (West Brighton), the Island, and the state are confused into a single entity, knowledge which has been presented formally but which has not been suitably anchored to previously held informal knowledge (Bruner's "compatability problem," cited above) can result in productions which are ludicrous and empty. But the exercise, imperfectly understood as it appears to have been, at least had the virtue of trying to get the children to integrate different kinds of knowledge. The whopping majority of the 465 children in the group simply acted on instructions to the effect that they should make an outline of Staten Island and indicate the location of West Brighton. All of these, in effect, show an outline of dubious shape with an "x" or circle arbitrarily placed and labeled "West Brighton." As an exercise in obedience, it seems to have been highly effective; as a pedogogical device, it has questionable merit.

The discrepancy between formal and informal learning is further demonstrated by comparing the 336 maps obtained from freshman, sophomore, junior, and senior high school girls from the Arrochar section of the Island (near the Verrazzano Narrows Bridge) with the other maps. The Arrochar maps were obtained through an art appreciation class attended by all of the students, but at different times during the week. The maps differ from each other primarily in the degree of copying skill displayed and in the nature and number of places depicted. All of the maps have roughly the same, standard, orientation and all approximate the actual shape of the Island, though the specific map used as a guide seems to have varied from room to room. (There were four groups of freshmen, and three each of sophomores, juniors, and seniors). Thus Ward's Point (Tottenville) is indicated 11 times among the 336 maps, but 10 of those 11 were in a single group of 21 seniors. On the other hand, only five of 594 girls in a high school much closer to Tottenville indicated "The Point."

In the same way, the postal zoning map was the model for only one senior and one sophomore student, but 13 juniors and 19 freshmen used it(see Figure 33). Maps representing postal zones are virtually unheard of among the other 1400-plus maps. The Staten Island Rapid Transit (SIRT) commuter train is frequently mentioned on the other sketch maps, but none of the 85 sophomores and none of the 73 seniors in the Arrochar school indicated it. Only four of 58 juniors (about seven per cent) show it, and even the 20 per cent (17 of 86) of the freshmen who indicate the train may be low, so far as the remainder of the maps is concerned.

It would appear from the Arrochar case that maps elicited in a formal learning situation may teach the students something about the Island, but the maps do not correspond to the pragmatic maps employed by them in actually moving around on the Island. And if the same students were asked to produce sketch maps in a year from now, in accordance with the "official" instructions,

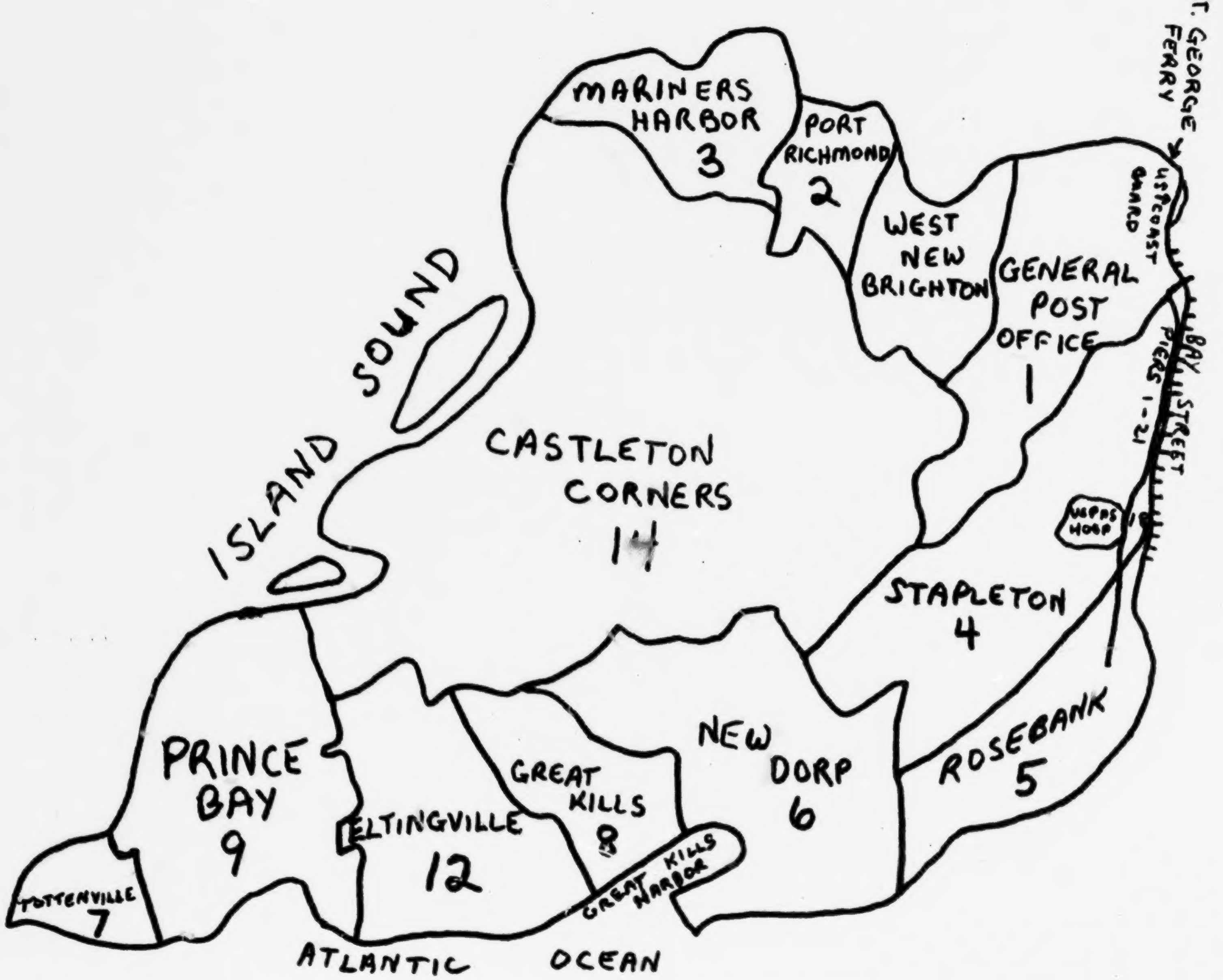

Figure 33. "Sketch map" of high school student, showing final digit(s) of Island postal zones. See text.

we should expect to get about the same range of variation as we got this time for the bulk of the sketch maps. That is, we should expect to find a number of North Shore orientations, with the "real" shape of the Island bearing a reverse relationship to the communities depicted, and so forth. On the other hand, where individuals have first tried to draw a map and have subsequently examined a commercial map, there is typically a great display of interest in how things "really" are. We would expect that such individuals would show a greater awareness of relationships on the Island in the future, at least for a while. Here, again, it appears that a subsequent retest would be instructive.

CONCLUSIONS

The loudest and most persistent refrain that emerges from this informal learning study is that what is personally important--what is relevant--enters into a cognitive structure. What is not perceived as useful or important is likely to be omitted from the structure, or if it does enter into it the result is a distorted conceptualization. Cognitive maps of Staten Island are practical instruments, whether the individuals concerned are elderly natives with a life-long passion for local affairs or whether they commute to a single point and are completely apathetic about the Island. In the former case, everything about the Island is relevant and the cognitive structure is rich; in the latter case the cognitive structure is impoverished.

Relevance, or what is important for guiding behavior, is reflected in the simplest maps of children, where only significant features of the immediate neighborhood are noted. It is reflected in the maps of commuters who show only key landmarks (bridge, ferry) and principal travel routes to the destination. Relevance is reflected in the maps of adult natives who conceive of the Island in terms of roads and streets that lead to important areas of the Island, such as those where they go for most of their shopping. If they drive, auto routes are prominent; if they take the train, auto routes are given less attention. Some maps are, indeed, little more than stylized bus routes because it is not the arrangement of communities that is important so much as it is the relationship of particular communities to the paths that connect them with home base. In such cases the paths equate to numbers (of the busses) and the particular twists and turns followed by the bus is not relevant. Children who spend most of their time in a single neighborhood, typically moving about on foot, tend to draw maps which are detailed for that neighborhood but which ignore the remainder of the Island. Even adults with relatively rich maps tend to collapse them by excluding irrelevant sectors, such as the whole western side between the Goethals Bridge and the Outerbridge Crossing. And some children and adults have ethnocentric maps that have their own neighborhoods dead center and all else depicted peripherally.

Cognitive maps, then, depend upon direct experience. Where experience is limited, trivial, or missing, the cognitive structures exclude information. Where experience is misleading, as in the case of mistaken landmarks (seeing New Jersey to the north and thinking it is to the west, or perceiving Richmond Avenue as a straight east-west path as one which is more north-south), the cognitive structure is likely to lack clarity.

Because the cognitive maps depend upon experience, they are highly individual. Yet there are features of common agreement: cardinal points are not relevant for most individuals even though the North and South Shores are important frames of reference. The East Shore area is important, but the label is not. The western shore lacks both a popular label and any importance for most Islanders. The shore around the Island contrasts with the more elevated areas, so that most Islanders are pretty well agreed on what is *down*; what is *up* depends upon the slopes in a specific neighborhood, and not on the Island topography as a whole. There is overall agreement on what is *out*, and this is most importantly determined by relative population density, the availability of shopping facilities, and by the public transportation system, which begins at St. George (terminal for the ferry to Manhattan, the train, and the busses) and splays out to all parts of the Island.

The interplay of "facts" obtained indirectly, as by looking at a commerical map or by hearsay from a teacher, and the facts obtained through direct experience--that is, essentially the interplay of formal and informal learning --has curious results in some cases. People may use what they know from formal study even if it does not coincide with what they know from personal experience. This is clear from the North Shore orientations, in which an arrangement of Island communities is distorted into an artificial framework that is provided by the "true" shape of a commercial map. Even though North Shore maps tend to be far more detailed than maps with the Brooklyn orientation, the latter tend to be very realistic, undistorted by the "facts" of shape and cardinal orientation. They are transparent, showing clearly how the method of transportation has formed the basis of the cognitive structure. One of the most interesting displays of how active performance can structure a map was indicated in the case of a salesman who had a series of communities reversed near the southwest part of the Island. It seems that his normal route proceeds from north to southwest, following the South Shore, but gradually curves around toward the west and north, so that the route follows a gentle "U." Evidently he is not aware that he has reversed his direction until he has completed the turn, because the communites are listed as if he were still heading toward the southwest.

Method of transportation concerns not only whether one is walking, driving, or riding or the type of vehicle employed, but more importantly it concerns whether one is being passively transported or is actively determining his own route. The abundant maps showing the train to run in a straight line, for example, may be phychologically correct, but they do not reflect the physical course of the train. In general, people who govern their own routes tend to have technically more accurate maps than people who are usually transported. This applies as well to children who have detailed neighborhood maps, based on the experience of walking around it, even though the remainder of the Island may be ignored or grossly distorted. In such cases we cannot *deny* that there is latent learning, but we can say that there is not much evidence for any appreciable amount of useful latent learning in the development of cognitive maps of the Island.

As to the concept of reinforcement, we may assume that the experiences implied by the maps which are produced have been reinforced, though this is less relevant than the question of what those reinforced experiences have been. All of the genuine cognitive maps (or those parts of them which we have been able to tap) imply that the relationships of certain communities and paths have been reinforced by the successful arrival at the appropriate destinations. But the huge number of postal-type maps imply that the students were being reinforced only for what appears to have been a mechanical and cognitively meaningless exercise. The students who simply drew a circle around the label "West Brighton" were reinforced for a similarly empty excercise if the teacher showed her approval. So reinforcement as such is not terribly important here, but reinforcement for the active display of interest probably would be profitable. Such would seem to be the case for the Tottenville youngsters whose interest in the Island was supported both by approval and by formal instruction on the subject. And it is surely the case that "good informants" are reinforced by the reception they receive during a display of their local knowledge (assuming they stop short of boring the listener).

In brief, then, people will form cognitive maps informally, and the maps will be useful instruments. Very rich maps of the Island are usually accurate, but the distortions which come from empty learning suggest that it is not enough merely to show someone how something "really" is (as the shape of the Island in the case of North Shore orientations, for example), or to give a mere statement of fact to insure that formal instruction will result in a meaningful increment to the student's knowledge. But formal instruction can facilitate the development of a coherent body of knowledge by requiring the active application of that material to information which has been derived from experience. The student must understand in a basic way that the information he is being exposed to has a bearing on his behavior. The material, as college students have been protesting so loudly in recent years, must be relevant.

REFERENCES

BERLIN, Brent and A. Kimball ROMNEY

1964 Descriptive semantics of Tzeltal numeral classifiers, in A. Kimball Romney and Roy Goodwin D'Andrade (eds) Transcultural Studies in Cognition, pp. 79-98. Special publication of the American Anthropologist 66 (Part 2, Number 3).

BROWN, Warner

1932 Spatial integrations in a human maze, University of California Publications in Psychology 5 (Number 5): 122-134.

BRUNER, Jerome S.

1959 Learning and thinking, Harvard Educational Review 29: 184-192.

1966 Some elements of discovery, in Lee S. Shulman and Evan R. Keislar (eds) Learning by Discovery, pp. 101-113. Chicago: Rand McNally & Company.

CONKLIN, Harold C.
1955 Hanunóo color categories, *Southwestern Journal of Anthropology* 11: 339-344.

DODWELL, P.C. and D.E. BESSANT
1960 Learning without swimming in a water maze, *Journal of Comparative Physiological Psychology* 53: 422-425.

ESTES, W. K.
1959 The statistical approach to learning theory, in S. Koch (ed), *Psychology: A Study of a Science*; Volume 2, *General Systematic Formulations, Learning, and Special Processes*, pp. 380-491. New York: McGraw-Hill.

FEARING, Franklin
1954 An examination of the conceptions of Benjamin Whorf in the light of theories of perception and cognition, in Harry Hoijer (ed) *Language in Culture*, pp. 47-81. Chicago: The University of Chicago Press.

FISHMAN, Joshua, *et al*.
1968 *Bilingualism in the Barrio*. Final report on Contract No. OEC-1-7-062817-0297, U.S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research. Two volumes.

FRAKE, Charles O.
1961 The diagnosis of disease among the Subanun of Mindanao, *American Anthropologist* 63: 113-132.

GAGNÉ, Robert M.
1966 Varieties of learning and the concept of discovery, in Lee S. Shulman and Evan R. Keislar (eds) *Learning by Discovery*, pp. 135-150. Chicago: Rand McNally & Company.

GARFINKEL, Harold
1967 *Studies in Ethnomethodology*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

GOFFMAN, Erving
1961 *Encounters*. Indianapolis, Indiana: The Bobbs-Merrill Company, Inc.

HALL, Edward T.
1959 *The Silent Language*. Garden City, New York: Doubleday & Company, Inc.

1966 *The Hidden Dimension*. Garden City, New York: Doubleday & Company, Inc.

HAUGEN, Einar
1957 The semantics of Icelandic orientation, Word 13: 447-459.

HAWKINS, David
1966 Learning the unteachable, in Lee S. Shulman and Evan R. Keislar (eds) Learning by Discovery, pp. 3-12. Chicago: Rand McNally & Company.

HILGARD, Ernest R. and Richard C. ATKINSON
1967 Introduction to Psychology. New York: Harcourt, Brace & World, Inc.

HILTON, George W.
1964 The Staten Island Ferry. Berkeley, California: Howell-North Books.

HOWELL, Richard W.
1968 Linguistic choice and levels of social change, American Anthropologist 70: 553-559.

LYNCH, Kevin
1960 The Image of the City. Cambridge, Mass. & London: The MIT Press.

MURPHY, Gardner and J. HOCHBERG
1951 Perceptual development: some tentative hypotheses, Psychological Review 58: 332-349.

SHEGLOFF, Emanuel A.
1968 Sequencing in conversational openings, American Anthropologist 70: 1075-1095.

STEEL, David
1968 Where people are real, Manchester Guardian Weekly, Thursday, April 25, 1968.

TOLMAN, Edward Chace
1948 Cognitive maps in rats and men, Psychological Review 55: 189-208.

TOWNSEND, Edward Arthur and Paul J. BURKE
1962 Learning for Teachers. New York: The Macmillan Company.

WANGERIN, Ruth
1969 The last goodbye. Unpublished manuscript.

WHORF, Benjamin Lee
1956 Language, Thought and Reality, Selected Writings of Benjamin Lee Whorf, edited and with an introduction by John B. Carroll. Cambridge, Mass.: The Technology Press of MIT; New York: John Wiley & Sons, Inc.; London: Chapman & Hall, Ltd.

WITTROCK, M. C.
1966 The learning by discovery hypothesis, in Lee S. Shulman and Evan R. Keislar (eds) Learning by Discovery, pp. 33-75. Chicago: Rand McNally & Company.